



Ref No. 0309 L7/19A

10th January, 2024

The Director
Zambia Environmental Management Agency
P.O. Box 35131
LUSAKA

Dear Sir,

**RE: SMELTERCO NCHANGA SMELTER BI-ANNUAL STATUTORY REPORT FOR THE PERIOD OF
JULY 2023 TO DECEMBER 2023**

Please find attached a report fulfilling the requirements of the Environmental Management Act no. 12 of 2011 under the following listed Statutory Instruments No. 112 of 2013 of the Environmental Management (Licensing) Regulations of 2013, which requires the submission of bi-annual report to the Zambia Environmental Management Agency Inspectorate.

1. Part II: Emission License - NDL/EMM/00708/Z10/2014/2
2. Part III: Waste Management License - NDL/WM/00708/Z10/2014/2
3. Part IV: Hazardous Waste License - NDL/LHWM/00708/Z10/2014/2
4. Part V: Pesticides and Toxic Substances License - NDL/PTS/00708/Z10/2014/2
5. Part VI: Ozone Depleting Substances Licenses - NDL/ODS/00708/Z10/2014/2

Yours faithfully

CHARLES SHONONGO
PLANT MANAGER -SMELTER

Cc ZEMA Northern Region
File

SMELTER BI-ANNUAL REPORT TO ZAMBIA ENVIRONMENTAL MANAGEMENT AGENCY (ZEMA) FOR THE PERIOD JULY TO DECEMBER 2023

A. KONKOLA COPPER MINES PLC - NCHANGA SMELTER

1. EVALUATION OF COMPLIANCE TO ENVIRONMENTAL LICENCES/ PERMITS

There are five (5) Environmental Licenses for KCM Chingola operations. From these five (5) licenses, there are 16 Sub licenses/facilities, which are under Nchanga Smelter. During the period under review, four (4) licenses were compliant (Hazardous Waste, Ozone Depleting Substances, Pesticide and Toxic Substances and Waste Management) and one (1) license is not compliant (Emissions).

Table 1 below presents a summary of compliance for Nchanga Smelter with respect to Environmental Licenses.

Table 1: Summary of Evaluation of Compliance

Total number of conditions	340
Number of compliant conditions	338
Number of Non-compliant conditions	2
Total number of facilities	16
Number of compliant facilities	14
Number of non- compliant facilities	2
Total number of licenses	5
Number of compliant licenses	4
Number of non-compliant licenses	1

Overall Compliance (by license)	80.00%
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2. EMISSIONS

Under the Emission license, there are three (3) sub-licenses/facilities under Nchanga Smelter. These are:

- i) Emissions license for the Anode, Slag Cleaning and Cobalt Recovery Furnaces
- ii) Emission license for the 1850TPD Acid Plant Stack
- iii) Emission license for the Standby Diesel generator sets 1, 2, 3 and 4.

In order to comply with the general provisions of the Environmental Management (Licensing) Regulations of 2013, Konkola Copper Mines (KCM) has engaged Tibon Enviro Solutions Ltd to monitor emissions from process stacks and from the standby diesel generators at Nchanga Smelter on a monthly basis. Online analyzers are also used for monitoring of emission on daily basis for immediate response to anomalies

2.1. EMISSION LICENCE FOR THE ANODE, ELECTRIC AND COBALT RECOVERY FURNACES

During the period under review, stack monitoring was done for all the furnace stacks except for Cobalt recovery Furnace No. 1 (CRF 1) which has been on shut down for maintenance since January 2022.

2.1.1. Anode Furnaces Emissions

Table 2 below shows the gaseous and heavy metal emissions from the Anode Furnaces for the period under review.

Table 2: Anode Furnace Stack Emissions

Emission Limits	Pollutant Concentration(mg/Nm ³)							
	Dust	SO ₂	CO	As	Cd	Cu	Pb	Hg
	50	1000	175	0.5	0.05	1	0.2	0.05
July 2023	7.59	NA	NA	NA	NA	NA	NA	NA
August 2023	71.42	147.67	393.65	0.03	0.01	20.71	3.71	0.00014
September 2023	83.28	145.77	127.88	0.13	0.02	20.47	1.28	0.00021
October 2023	12.91	NA	NA	NA	NA	NA	NA	NA
November 2023	4.25	NA	NA	NA	NA	NA	NA	NA
December 2023	3.34	NA	NA	NA	NA	NA	NA	NA

NB: NA- "Not Analyzed", Plant on Shutdown in July and from October 2023, to date.

Figures for dust, on the shutdown months are from the online analyser.

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Anode furnace emissions were not compliant for dust and heavy metals (Dust, Co, SO₂, Cu, & Pb,) during the period under review. Installation of an off gas cleaning system at Anode Furnaces is in progress. The installation of this system will ensure that emissions are below the statutory limit. Refer to **table 8** for the status of the Anode Furnace project.

In the interim, emission surveillance camera at Anode Furnace has been installed and Operators are able to control the black smoke emission from the stack, which is an indicator of elevated dust (soot levels)

2.1.2. Slag Cleaning Furnace Emissions

Table 3 below shows the gaseous and heavy metals emissions from the Slag Cleaning Furnace for the period under review.

Table 3: Slag Cleaning Furnace Stack Emissions

Emission Limits	Pollutant Concentration(mg/Nm ³)							
	Dust	SO ₂	CO	As	Cd	Cu	Pb	Hg
	50	1000	175	0.5	0.05	1	0.2	0.05
July 2023	19.53	15.15	0.01	NA	NA	NA	NA	NA
August 2023	96.15	390.62	1.25	0.05	0.01	10.59	0.66	0.00029
September 2023	95.88	100.99	0.00	0.06	0.01	9.25	0.57	0.00015
October 2023	56.56	53.59	1.27	NA	NA	NA	NA	NA
November 2023	35.87	4.87	0.94	NA	NA	NA	NA	NA
December 2023	58.91	0.52	4.75	NA	NA	NA	NA	NA

NB: NA- "Not Analyzed", Plant on Shutdown in July and from October 2023, to date.

Figures for dust, SO₂ and Cobalt on the shutdown months are from the online analyser.

Dust, Copper and Lead at the Slag Cleaning Furnace was non-compliant during the period under review. The installation of the bag house has been completed and running. Readings sometimes not within the normal. Optimization of plant operating parameters and equipment rectifications is ongoing to ensure compliance.

In the interim, water spray nozzles have been installed in the Gas Cooler to improve its efficiency and in the process reduce dust levels in the emissions. For status of the Slag Cleaning project, refer to **table 8**.

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2.1.3. Cobalt Recovery Furnace No.2 (CRF 2) Emissions

Table 4 below shows the gaseous and heavy metals emissions from the Cobalt Recovery Furnace No. 2 for the period under review.

Table 4: Cobalt Recovery Furnace No.2 (CRF 2) Emissions

Emission Limits	Pollutant Concentration(mg/Nm ³)							
	Dust	SO ₂	CO	As	Cd	Cu	Pb	Hg
	50	1000	175	0.5	0.05	1	0.2	0.05
July 2023	12.10	0.26	NA	NA	NA	NA	NA	NA
August 2023	122.15	121.95	0.00	0.08	0.01	10.62	3.36	0.00024
September 2023	138.23	263.90	3.75	0.09	0.02	10.28	0.98	0.00024
October 2023	804.89	0.48	NA	NA	NA	NA	NA	NA
November 2023	221.36	0.47	NA	NA	NA	NA	NA	NA
December 2023	155.27	0.46	NA	NA	NA	NA	NA	NA

NB: NA- "Not Analyzed", Plant on Shutdown in July and from October 2023, to date.

Figures for dust and SO₂ on the shutdown months are from the online analyser.

Dust, Copper, and Lead at Cobalt Recovery Furnace no.2 were non-compliant during the period under review. In order to ensure compliance, Dust in the off gas duct system is cleaned at every monthly maintenance shutdown. Replacement of the bag filters are done and ongoing. All abnormal emission reported are investigated and actions implemented to ensure compliance.

2.1.4. Cobalt Recovery Furnace No.1 (CRF 1) Emissions

Cobalt Recovery Furnace No: 1 (CRF 1) was not monitored during the period under review. It has been on shut down for maintenance since January 2022

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2.2. EMISSIONS FROM 1850TPD SULPHURIC ACID PLANT

The 1850TPD Sulphuric Acid stack license condition requires monitoring of the Sulphur dioxide emissions. Table 5 depicts the stack monitoring results for 1850TPD Sulphuric Acid plant stack.

Table 5: 1850tpd Sulphuric Acid Plant Stack Emissions

Month	SO ₂ Emissions (Kg/day)	Emission Limit (Kg/day)	Average Plant Operating Hours	Total Hours of Operation
July 2023	197	4300	NA	NA
August 2023	3,493	4300	19.70	413.64
September 2023	3,713	4300	17.27	345.48
October 2023	1,863	4300	16.92	270.68
November 2023	1,306	4300	16.78	134.22
December 2023	7	4300	0.00	0.00
Average	2076.56	4300	17.67	291.01

*NB: NA- "Not Analyzed", Plant on Shutdown in July and from October 2023, to date.
Figures for SO₂ on the shutdown months are from the online analyser.*

Sulphur Dioxide emissions from the 1850tpd Sulphuric Acid Plant Main Stack was compliant for the period under review. Catalyst analysis, change done, and stack now compliant.

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2.3. EMISSION FROM THE STANDBY DIESEL GENERATOR SETS 1, 2, 3 AND 4

Nchanga Smelter operates four (04) standby Diesel Generator Sets. These sets are for emergency purpose and are only used in instances of power outages. These sets are primarily used to power water supply to the surrounding furnaces for cooling purposes. Test runs are also done once per week for each set. The use of the Gensets is not frequent, as they are standby Gensets and KCM has been exempted from installation of continuous monitors. Table 6 below provides a summary of monitoring results for the period from July 2023 to December 2023.

Table 6: Diesel Generator Sets Emissions

Month	Concentration in mg/Nm ³											
	DG Set 1			DG Set 2			DG Set 3			DG Set 4		
	Dust	CO	SO ₂	Dust	CO	SO ₂	Dust	CO	SO ₂	Dust	CO	SO ₂
Emission Limit	50	100	850	50	175	850	50	100	850	50	100	850
July 2023	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
August 2023	41	209	201	44	197	171	49	233	183	38	218	203
September 2023	38.85	348	164.9	42.06	369	153	39.48	403	162	40.79	281	159
October 2023	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
November 2023	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
December 2023	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S

NB: N/S- Not Sampled, Plant on shutdown at the time the monitoring consultant were scheduled to conduct monitoring

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2.4. GROUND WATER MONITORING

Ground water was not sampled during the period under review. Boreholes currently requires flushing as the scavengers tempered with them. Flushing works are yet to commence. Currently with commercial under enquiry stage.

2.5. INCIDENTS RECORDED FOR THE PERIOD UNDER REVIEW

Table 7 shows a summary of incidents on abnormal emissions that were recorded and actions taken during the period under review.

Table 7: Incidents Recorded on Abnormal Emissions Discharged and Actions Taken

Date	Purpose of Operation	Details of Noncompliance	Cause	Corrective Measures
28.08.2023	Copper Smelting	Anode furnace dust loading at 71.42mg/Nm ³ , Slag Cleaning Furnace at 96.15mg/Nm ³ and Cobalt Recovery Furnace 2 at 122.16mg/Nm ³ were all above the limit of 50mg/Nm ³ . Sulphur dioxide (SO ₂) concentration Acid plant at 3492.5Kg/day was below the limit of 4300Kg/day. Lead concentration on AF 3.71/Nm ³ CRF2 3.36mg/Nm ³ and SCF 0.66/Nm ³ stacks exceeded limit of 0.2mg/Nm ³ . Copper concentration for Anode Furnaces Stack at 20.71 mg/Nm ³ , SCF at 10.59 mg/Nm ³ and CRF2 at 10.62 /Nm ³ were all above the limit of 1.0mg/Nm ³ .	- No pollution control equipment for Anode furnace - Under performance of the CRF 2 and SCF bag filters. - Need for change of catalyst at Sulfuric Acid Plant	- Action plan for the installation of equipment is in place refer to table 8 - Dust in the off-gas duct system is cleaned during every monthly shutdown. - Change of catalyst planned for at the annual shutdown
26.09.2023	Copper Smelting	Anode furnace dust loading at 83.28mg/Nm ³ , Slag Cleaning Furnace at 95.88 mg/Nm ³ and Cobalt Recovery Furnace 2 at 138.23 mg/Nm ³ were above the emissions limit of 50mg/Nm ³ .	No pollution control equipment for Anode furnace	Action plan for the installation of equipment is in place refer to table 8

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Date	Purpose of Operation	Details of Noncompliance	Cause	Corrective Measures
		Sulphur dioxide (SO₂) concentration Acid plant at 3713 Kg/day was below the limit of 4300Kg/day. Lead concentration on AF 1.28 mg/Nm³, CRF2 0.98 mg/Nm³ and SCF 0.57 mg/Nm³ stacks exceeded its limit of 0.2mg/Nm³. Copper concentration for AF at 20.47 mg/Nm³, CRF2 at 10.28 mg/Nm³ and SCF at 9.25 mg/Nm³ were all above the limit of 1.0mg/Nm³.	- Under performance of the CRF 2 and SCF bag filters. - Need for change of catalyst at SAP	- Dust in the off-gas duct system is cleaned during every monthly shutdown. - Change of catalyst planned for at the annual shutdown
28.10.2023	Copper Smelting	Anode furnace dust loading at 12.91mg/Nm³, Slag Cleaning Furnace at 56.56mg/Nm³ and Cobalt Recovery Furnace 2 at 804.89mg/Nm³ of which only CRF and SCF were above the emissions limit of 50mg/Nm³. Acid plant at 1863.39Kg/day was below the limit of 4300Kg/day.	- No pollution control equipment for Anode furnace - Under performance of the CRF 2 and SCF bag filters. - Need for change of catalyst at SAP	- Action plan for the installation of equipment is in place refer to table 8 - Dust in the off-gas duct system is cleaned during every monthly shutdown. - Change of catalyst planned for at the annual shutdown

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Date	Purpose of Operation	Details of Noncompliance	Cause	Corrective Measures
05.11.2023	Copper Smelting	Anode furnace dust loading at 4.25mg/Nm ³ (sampling was conducted during receiving and oxidizing). Slag Cleaning Furnace at 35.87mg/Nm ³ and Cobalt Recovery Furnace at 221.36mg/Nm ³ of which only CRF was above the limit of 50mg/Nm ³ . Acid plant at 1306.24Kg/day was below the limit of 4300Kg/day	- No pollution control equipment for Anode furnace - Under performance of the CRF 2 and SCF bag filters. - Need for change of catalyst at SAP	- Action plan for the installation of equipment is in place refer to table 8 - Dust in the off-gas duct system is cleaned during every monthly shutdown. - Change of catalyst planned for at the annual shutdown
05.12.2023	Copper Smelting	Anode furnace dust loading at 3.34mg/Nm ³ (sampling was conducted during receiving and oxidizing). Slag Cleaning Furnace at 58.91mg/Nm ³ and Cobalt Recovery Furnace at 155.27mg/Nm ³ of which only CRF2 and SCF were above the limit of 50mg/Nm ³ . and Acid plant at 7.16Kg/day was below the limit of 4300Kg/day	- No pollution control equipment for Anode furnace - Under performance of the CRF 2 and SCF bag filters. - Need for change of catalyst at SAP	- Action plan for the installation of equipment is in place refer to table 8 - Dust in the off gas duct system is cleaned during every monthly shutdown. - Change of catalyst planned for at the annual shutdown

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2.6. CORRECTIVE ACTION FOR NON-COMPLIANCES

For all the non-compliances under this license, Nchanga Smelter has put in place corrective actions in order to comply. Below is the action plan for the Anode and the Electric Furnace stacks.

Table 8: Corrective Action Plan for Non-Compliances

License Condition	Stack	Plan	Status	Proposed Target
Emission License (ZEMA/NDL/EMM/007 08/Z10/2014)	Anode Furnace	Installation of the off-gas cleaning system at Anode Furnaces (wet scrubber)	Still at design stage. Revalidation of the order is in progress	FY 2023/2024
	Slag Cleaning Furnace	Installation of new bag house at Slag Cleaning Furnace	- The Bag House has been installed and equipped with bag filters. - Currently under rectifications associated with the commissioning phase to fine tune operations parameters.	Done and on going
	Cobalt Recovery Furnace (CRF 2)	Improve on performance of the CRF 2	- Optimize plant parameters to reduce on pollution - Dust in the off-gas duct system is cleaned at every monthly maintenance shutdown	Done and on going
	Acid Plant 1850TPD	Replacement of Vanadium Pentoxide (Sulphuric Acid Catalyst) and Mist Eliminators.	Change of catalyst completed and stack is compliant	Closed

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3. WASTE MANAGEMENT

Nchanga Smelter has obtained licenses to;

- a. Transport slag from Nchanga Smelter to Slag Dump at reclaimed Tailings Dam No.2.

3.1. LICENCE TO TRANSPORT SLAG TO SLAG DUMP AT RECLAIMED TAILINGS DAM NO.2

Slag from Smelter is transported to the slag dump using 40 tonnes Bell trucks which are in good condition and personnel trained and provided with proper PPE. All conditions for transportation were being complied with for the period under review.

3.2. STATUTORY INSPECTION OF SLAG DUMP TD2

Knight Piesold Consulting Ltd carried out the statutory dump inspection under the Mines and Minerals Act in November 2022 at New Slag Dump TD2. The report clearly states that the dumps are secure and do not give rise to major pollution. Dumping at the new slag dump commenced in May 2016.

In order to prevent illegal entry by unauthorized persons, the Slag Dump site is under 24 hours surveillance by Mine Security Personnel with reinforcement from State Paramilitary Police.

Table 9 below shows a summary of the quantities of Slag that has been disposed of at the New Dump site at TD 2 during the period under review.

Table 9: Quantities of Slag Disposed of at New Dump Site at TD2

Month	Slag Generated from CRF 1	Slag Generated from CRF2	Total Generated (CRF1+CRF2)	Total Quantity of slag Disposed
July 2023	SD	0.00	0.00	2,442
August 2023	SD	15,272	15,272	13,302
September 2023	SD	12,920	12,920	11,199
October 2023	SD	10,600	10,600	10,258
November 2023	SD	5,605	5,605	5,536
December 2023	SD	100	100	109
TOTAL	-	44,497	44,497	40,404

Note: "SD" -Furnace under care and maintenance since January 2022

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3.3. CHEMICAL ANALYSIS OF SLAG DISPOSED

The table below shows the chemical analysis of slag disposed of at TD2 dumpsite for the period of July 2023 to December 2023 from the Cobalt Recovery Furnace No. 2.

Table 10: Chemical Analysis of Slag Disposed of at TD2 Slag Dump

Month	Parameters (%)								
	Cu	Fe	SiO ₂	CaO	MgO	Co	S	Al ₂ O ₃	Fe ₃ O ₄
July 2023	NS	NS	NS	NS	NS	NS	NS	NS	NS
August 2023	0.39	24.85	38.27	9.83	8.59	0.11	0.25	10.07	0.72
September 2023	0.39	24.97	37.67	10.37	7.47	0.10	0.26	9.94	0.83
October 2023	0.44	25.94	37.34	9.77	6.04	0.11	0.21	10.26	0.82
November 2023	0.54	23.94	36.72	10.66	7.57	0.07	0.22	9.51	0.97
December 2023	-	-	-	-	-	-	-	-	-

Note: NS - Not sampled Plant on shutdown

December –No Production

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4. HAZARDOUS WASTE MANAGEMENT

Nchanga Smelter has been given a license to generate and store hazardous waste. This license has the following facilities/sub license:

- i) License to generate hazardous waste
- ii) License to store hazardous waste
- iii) License to handle Sulphur ash and Spent catalyst

4.1. LICENCE TO GENERATE HAZARDOUS WASTE

The plant generates hazardous waste namely; used oil, oil sludge and used batteries.

4.1.1. Licence to Generate Used Oil

Below are the tables showing the quantities of used oil and sludge generated for the period of July 2023 to December 2023.

Table 11: Quantities of Waste Oil Generated

Month	Opening Stock	Waste Oil Generated (tonnes)	Total	Waste Oil Disposed (tonnes)	Closing Stock
July 2023	0	22	22	0	0
August 2023	0	9	9	0	0
September 2023	0	25	25	0	0
October 2023	0	1.5	1.5	0	0
November 2023	0	0	0	15	0
December 2023	0	0	0	0	0
TOTAL		57.5		15	

Note: Waste oil generated from the plant is consumed in the furnaces as fuel.

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Table 12: Quantities of Used Oil Sludge Generated

Month	Opening Stock	Oil Sludge Generated (tonnes)	Total	Quantity Disposed of (tonnes)	Closing Stock
July 2023	0	2	2	0	0
August 2023	0	5	5	0	0
September 2023	0	4	4	0	0
October 2023	0	0.45	0.45	0	0
November 2023	0	0.32	0.35	0	0
December 2023	0	0.18	0.18	0	0
TOTAL		11.95		0	

Note: Oil sludge generated from the plant is used in the furnaces for reductions process.

4.1.2. Generation of Fluorescent Tubes

Below are the tables showing the quantities of fluorescent tubes generated for the period of July 2023 to December 2023.

Table 13: Quantities of Fluorescent Tubes Generated

Month	Quantities of Fluorescent Tubes Generated (MT)	Storage area
July 2023	0	Substation No.1
August 2023	0	Substation No.1
September 2023	0	Substation No.1
October 2023	0	Substation No.1
November 2023	0	Substation No.1
December 2023	0	Substation No.1
TOTAL	0	

Note:

- All fluorescents tubes have been phased out and replaced with Light Emitting Diode (LED) bulbs. Hence, nothing generated from July to December 2023.
- Old stocks of the fluorescent tubes about seven (7) by 210ltr sealed containers are temporarily been kept in the Substation (SS4) restricted access area.

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4.1.3. Generation of Batteries

Below is a table showing the quantities of batteries generated from July 2023 to December 2023.

Table 14: Quantities of Batteries Generated

Month	Opening Stock	Quantities of Batteries Generated (tonnes)	Closing Stock	Storage area
July 2023	0	0	0	Substation No.1
August 2023	0	0	0	Substation No.1
September 2023	0	0	0	Substation No.1
October 2023	0	0	0	Substation No.1
November 2023	0	0	0	Substation No.1
December 2023	0	0	0	Substation No.1
TOTAL	0	0	0	

None generated for the period under review

4.2. LICENSE TO STORE HAZARDOUS WASTE

Used oil and oil sludge are stored at the fuel offloading bay area while fluorescent tubes and batteries are stored at the electrical substation. These are restricted areas and only authorized personnel have access. The waste stored in these areas are both quantified and recorded as shown in Tables 11, 12, 13 and 14 above. The storage areas meet the requirements set in the Eighth schedule of the Environmental management (licensing) regulations of 2013.

4.3. LICENCE TO HANDLE HAZARDOUS WASTE

4.3.1. Licence to Handle Sulphur Ash

Sulphur ash is a waste product from 500TPD Sulphuric acid plant. In the period under review, no Sulphur ash was disposed of. Plant had resumed operations from August 2023 and about 250mt of Sulphur ash has been generated pending disposal.

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4.3.2. Licence to Handle Spent Catalyst

KCM has obtained the license to handle spent catalyst (Vanadium Pentoxide). Spent catalyst is a waste catalyst from the converter at Acid plant.

160m³ of spent catalyst, (Vanadium Pentoxide) was disposed of in 2016 and 2017 at TD5 by fixation and capsulation and approximately 400m³ of spent catalyst stored pending disposal. No spent catalyst was disposed during the period under review.

5. PESTICIDES AND TOXIC SUBSTANCES

Nchanga Smelter has been given a license for pesticide and toxic substances. This license has the following facilities/sub license:

- i) License to import toxic substances
- ii) License to store pesticide and toxic substances at water treatment plant (WTP) and Sulphuric acid plants acid storage tanks.
- iii) License to transport acid
- iv) License to export acid
- v) License to export spent catalyst (VK38)

5.1. LICENCE TO IMPORT TOXIC SUBSTANCES

Nchanga Smelter mainly imports water treatment chemicals from CureChem, which it uses at its water treatment plant and Sulphuric acid for Nchanga operations.

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Table 15 shows the quantities of these chemicals imported and consumed for the period July 2023 to December 2023. All the licensed conditions were compliant during importation of these materials.

Table 15: Quantities of Imported Chemicals Consumed

S N	Chemical Name	Monthly Consumption					
		July 2023	August 2023	September 2023	October 2023	November 2023	December 2023
1	Cortrol OS 5300 (23kg)/Organic oxygen scavenger	0.16	0.07	0.05	0.05	0.89	0.18
2	SOLUS AP 26 (25kg)/Phosphate based antiscalant- Boiler	0.03	0.10	0.05	0.03	0.37	0.10
3	Steamate NA0940E (22Kg)- Condensate anticorrosion	0.04	0.11	0.11	0.07	0.09	0.88
4	FlocBuildAP191, (200kg), Flocculant	0.00	0.00	0.00	0.00	0.00	0.00
5	Kleen MCT511E, 23kg - High pH- CIP	0.00	0.35	0.32	0.46	0.28	0.00
6	Sudfloc K300 275kg	2.75	4.95	4.40	4.13	3.58	6.33
7	Kleen MCT882, 20kg, Low pH-CIP	0.22	0.40	0.28	0.40	0.26	0.00
8	Cool C-12 25Kg- all organic closed loop chemical	0.00	0.30	0.08	0.20	0.33	0.20
9	COOL D 28 25Kg/ Biodispersant	0.10	0.33	0.38	0.45	0.35	0.10
10	Depositrol BL6501/ 23kg dispersant-cooling towers	0.07	0.39	1.15	0.46	0.35	0.04
11	MAX TREAT 6940	0.00	0.00	0.00	0.00	0.00	0.00
12	SPECTRUS NX 1100 /25kg- Biocide, dosed thrice a month	0.05	0.40	0.23	0.25	0.28	0.10
13	MAX TREAT 9601	0.00	0.00	0.00	0.00	0.00	0.00
14	Hypersperse MDC714 25kg Anti scalant	0.00	0.25	0.25	0.30	0.50	0.40
15	GenGard GN8165 23Kg/ Anti corrosion	0.55	0.85	1.40	1.00	0.58	0.04
16	Calcium Hypochlorite	0.28	0.48	1.12	0.73	0.79	0.72
17	Caustic Soda	2.20	5.60	4.70	1.50	1.00	3.00

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5.2. LICENCE TO STORE PESTICIDE AND TOXIC SUBSTANCES AT WATER TREATMENT PLANT (WTP) AND SULPHURIC ACID PLANTS ACID STORAGE TANKS.

The acid storage tanks are restricted areas and only authorized personnel are allowed access. Thickness test are carried out regularly on all storage tanks by SKF in order to prevent collapse of the tanks. The tanks are all in bunded areas, which are 110% of the storage capacity. Competent personnel do regular inspections on the bund wall to check its integrity. An emergency response procedure has been developed in an event of an accident.

5.3. LICENCE TO TRANSPORT ACID

Nchanga smelter transports acid to KCM operations by pipeline to (TLP) and road tankers to (Nkana). Regular inspections of the pipelines are carried out and replacement of the worn out pipelines done accordingly. Tankers are inspected during every loading to ensure compliance to the license conditions. An emergency response procedure has been developed and made known to all involved in the production and transportation of acid. Regarding acid movements, **Table 16** shows the acid movements from the 1850TPD Sulphuric Acid plants operated by Nchanga Smelter.

5.4. LICENCE TO EXPORT ACID

No acid was exported during the period under review.

5.5. LICENCE TO EXPORT SPENT SULPHURIC ACID CATALYST (VK38)

No spent catalyst was exported during the period under review.

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Table 16: Acid Movement for 1850tpd Sulphuric Acid Plant

	Opening Stock	Production	Receipts From 500 TPD	External Receipts	Supplied to TLP	Total Tanker Dispatch	Supplied to 500/1850TPD	Closing Stock	Dispatch to Nkana	External Sale
January 2023	316	0	0	7,440	7,694	33	0	28	33	0
February 2023	28	11,657	0	3,641	14,728	94	0	504	94	0
March 2023	504	9,838	0	1,203	10,052	63	0	1,431	63	0
April 2023	1,431	7,498	0	497	9,339	64	0	24	64	0
May 2023	24	3,436	0	1,182	4,501	92	0	49	92	0
June 2023	49	0	0	0	0	0	0	49	0	0
TOTAL	2,351	32,429	0	13,964	46,315	345	0	2,084	345	0

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OZONE DEPLETING SUBSTANCES

Nchanga Smelter uses R-22 and R410a, which are ozone-depleting substances. R-22 and R410a are used on the plant for servicing and repairing air conditioners and fridges. Regular inspections are carried out to ensure there are no leakages were the R-22 and R410a gases are being used. Smelter is compliant to all conditions relating to handling and storage of ozone depleting substances. During the period under review, R-22 and R410 were used at Smelter.

All conditions governing the sub licenses relating to handling, recovery and recycling of ozone depleting substances were compliant.

5.6. REFRIGERANTS ODS MONTHLY CONSUMPTION

Table 17 below shows the monthly consumption of Ozone Depleting Substances.

Table 17: Monthly Consumption of Ozone Depleting Substances

Refrigerants	Quantities (in tons)					
	July 2023	August 2023	September 2023	October 2023	November 2023	December 2023
R22	0.003	0.006	0.002	0.007	0.006	0.003
R134a	0	0	0	0	0	0
R407c	0	0	0	0	0	0
R404a	0	0	0	0	0	0
R410a	0	0	0	0.0113	0.0111	0.004
R600a	0	0	0	0	0	0
R290	0	0	0	0	0	0
R717	0	0	0	0	0	0
TOTAL	0.003	0.006	0.002	0.0183	0.0171	0.007

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5.7. ODS: CONTAMINATED REFRIGERANTS AND OILS

There were no refrigerants contamination incidents/accidents that occurred during the period under review.

5.8. ODS: POTENTIAL LEAKAGE POINTS

Routine inspections of potential leakage points of refrigeration and or air conditioning equipment is carried out by the appointed engineers.

5.9. ODS: RECOVERY AND RECYCLING OF R22

R22 and R410a were neither recovered nor recycled during the period under review.

Compiled by:
Environmental Coordinator- Smelter


Approved by:
Manager Environment SmelterCo