



**EPA**  
**LIBERIA**

# Environmental Protection Agency

Ensuring environmental protection & conserving biodiversity

**Full-scale Assessment to determine the efficacy of the implementation of the next course of action of the situation at Bea Mountain Mining Corporation's facility In Kinjor, Grand Cape Mount County**



**Presented by**

**EPA's Assessment Team**

**To: The ESIA Technical Review Committee/EXECUTIVE**

**Date of Assessment: July 03-06, 2022.**

# Presentation Outline

- Background
- Methodology (three teams)
- Social Engagement with the concerned communities;
- Sample collection (*TSF-R, Weleegee Creek, Marvoe Creek, Mafa River, and downstream of Mafa as far as Robertsport*);
- Troubleshooting of the entire TSF and site verification for TSF permit renewal
- *Conclusion/Recommendation*
- *Appendix: Photos, Maps imagery*

# Background

- On **24 May 2022**, the attention of the EPA was drawn to a publication in three media outlets of an alleged water pollution of the Mavor River, Grand Cape Mount County that resulted to the death of aquatic species,
- As a result, residents of Jekandor (*Gema village, Kpelle town, & Morris Town*) and nearby towns along the river basin made several calls to the EPA for an immediate intervention into the situation.
- The villagers alleged that Bea Mountain Mining Corporation (BMMC) was responsible for the water pollution.
- This allegation compelled the EPA to immediately dispatch a team of technicians to BMMC facility in Kinjor and surrounding towns (**25 May 2022**) to conduct a full-scale investigation to determine the cause and/or source of the alleged pollution;
- The Agency submitted a press release to the general public - pointing out the source and nature of the pollution event.
- The press release highlighted the need to conduct a second assessment **to determine the extent of the pollution, the current health of the riverine environment and to troubleshoot BMMC Tailings Storage Facility (TSF)** – the source of the pollution event, as determined in previous assessment by the EPA.
- Based on the aforementioned, the EPA led a second mission on **04 July 2022** to execute the mandate highlighted above.

## EPA's Team

Name	Position
<b>Team I: Social Engagement with the concerned communities</b>	
Daoda Socrates Carlon	Assist. Manager for Environmental & Social Impact Assessment
R. Baiyezenah Brown	Asst. Manager, Inter-sectoral
Mildred Chuka Piah	ESIA Data Officer
Clifforte A. Forte	Remediation Officer
Fongbanah Yarsiah	County Inspector
Amah Konah	Driver

## Team II: Sample collection

Rafael S. Ngumbu	Assist. Manager, Environmental Research Standard and Radiation Safety
R. Baiyezenah Brown	Asst. Manager, Intersectoral
Steward Borbor	Water Remediation Officer
Joseph Charles	Laboratory Technician
Lenn Gomah	Laboratory Technician
Varney Armah	Laboratory Technician
Adam Cisse	Driver

Name	Position
<b>Team-III</b> Troubleshooting of the entire TSF and site verification for its permit renewal environmental audit report	
John K. Jallah	Manager, Department of Compliance and Enforcement
Stanford Daniels	GIS Coordinator
Targen Daye	Compliance Analyst
Gregory Morris	ERS
Wellington Ben	Regional Inspector
Elijah Geeliken	Driver

## BMMC's Team

Ansu S. Sonit, Media Related Officer, and Boimah Freeman, Community Liaison Officer, Henry Vincent, Community Liaison Superintendent, Morris Gunter, Eviron. Supervisor, Yumus Saglam, Mac Coulibaly, TSF SUP, Emmanuel Weedor, TSF Forman

# Methodology

Considering the importance of the visit to ensure the situation at Jekandor is sustainably resolved, the team divided itself into three teams (headed by senior technicians from the Department of Compliance and Enforcement).

**Team I:** Social Engagement with the concerned communities;

**Team-II:** Sample collection (*TSF-R, Weleegee Creek, Marvoe Creek, Mafa River, and downstream of Mafa as far as Robertsport*)

**Team-III** Troubleshooting of the entire TSF and site verification for its permit renewal environmental audit repor.

- A thorough review of proponent's file
- Stakeholder engagement with affected communities and their legal representative (Cllr. Sannoh via phone),
- Sample collection
- Drone imaging
- Geospatial data collection and mapping
- In-situ analysis
- Quality control and assurance of sample collection and transportation to EPA's laboratory for analysis

# Social Engagement with the affected communities

- Prior to arrival in the landscape, the team placed a phone call to the local authorities as well as the leaders of the affected communities to inform them of the mission.
- Upon arrival at about 12:15 p.m, the team met with residents of the affected communities and BMMC representatives
- Mr. Gataweh, spokesman of the affected communities, welcomed the team and BMMC representatives .
- Mr. Baiyezenah Brown of the EPA was designated by the head of the EPA's team, Assistant Manager Carlon, to control the discussion. All participants were asked to introduce themselves before discussions began.
- The communities (Jekandor: *Gema village, Kpelle town, & Morris Village*) were present in the meeting, through constant consultation with their Lawyer, Cllr. Benedict Sannoh. In total, the affected communities were represented by thirteen men (13) and thirteen women (13).

# Stakeholders engagement with affected communities and their legal representative (Cllr. Sannoh via phone)

## Purpose of the Engagement

- Mr. Carlon thanked the people of Jekandor for the level of maturity and patience shown since the incident occurred. He then outlined the teams' mission and reaffirmed the Agency's commitment to ensuring that the situation is brought to a logical conclusion.
- Mr. Carlon apologized, on behalf of the Government of Liberia and the EPA, for the delay in getting back to the communities since the EPA's first visit in the landscape and also for the late arrival of the team. He explained that the delay was as a result of people politicizing the situation and since the EPA is a scientific institution, the Agency did not want to get involved with the politics of the situation.
- Mr. Carlon later appreciated the Management of BMMC for sending staff who were citizens of the County to represent them Company and said that he's happy that nothing bad happened to anyone in the communities. He applauded the people of Grand Cape Mouny County for the mature and peaceful manner in which they handled the situation.

# Key Disclosures from the Stakeholders engagement

- The affected communities provided a list of all items received from BMMC since the incident occurred; BMMC argued that they had supplied more items than recorded but could not provide a list of items supplied prior to the stakeholders engagement;
- The affected communities consist of 350 people, and 60 households. The communities complained that the current suppliers were inadequate;
- The community disclosed that they had appointed Cllr. Sannoh to act on their behalf on matters relative to the pollution event of May 2022;
- A signed list of weekly supply needed was submitted to EPA for onward submission to BMMC;



## Key Community Demands

- The community requested a copy of EPA' initial Laboratory results and findings from the previous assessment **(25 May 2022)**
- Weekly supply of food and water *(list of food items needed is appended to this report)*
- Ensure rejuvenation of the polluted water
- Improve road condition to Jekandor village
- Relocate residents of the affected communities (long term)

# Recommendations

- Ensure to invite BMMC as soon as possible to discuss findings and way forward;
- Ensure to maintain contact with the concerned communities, especially Jekandor to provide or share findings of the report;
- Communicate with BMMC on the need to supply food items as recommended by the communities with the full list drawn by the concerned communities;
- Communicate with the communities on the status of the little stream sampled as a control;

# Photos



# Photos



*Concerned Communities'' Spokesman reading out their list*

# Appendix

WANGCH  
DARRI D. CLAY, GOA-KHONKA DISTRICT  
GRAND CAYMAN ISLANDS COUNTY  
Supplies delivered by Red Mountain

MONTH	WATER	RICE	CHICKEN	FISH	OIL	SALT	SEASON	ONION	Others	Signature
* MAY	4 Sacs	-	-	-	-	-	-	-	-	
23	4 Sacs	-	-	-	-	-	-	-	-	
24	32 Sacs	11 bags	5 Ctns	-	1 Tin	2 Sacs	1 bucket	-	-	
26	40 Sacs	-	-	-	-	-	-	-	-	
TOTAL	87 Sacs	11 Bags	5 Ctns	-	1 Tin	2 Sacs	1 bucket	-	-	
* JUNE	-	-	-	-	-	-	-	-	-	
2	40 Sacs	5 Bags	-	-	1 Tin	1 Sack	-	1 Bag	-	
16	30	-	-	-	-	-	-	-	-	
22	30 Sacs	-	1 Ctn	3 Bags	-	-	-	-	-	
TOTAL	100 Sacs	5 Bags	3 Ctns	3 Bags	1 Tin	1 Sack	-	-	-	
* JULY	-	-	-	-	-	-	-	-	-	
1	40 Sacs	8 Bags	4 Ctns	4 Bags	-	-	-	1 Bag	-	

Record of food items supplied to the communities

Date: 04 July 2022

- ① Water
- ② Rice
- ③ Fish
- ④ Chicken
- ⑤ Oil
- ⑥ Rice
- ⑦ Dried
- ⑧ Salt
- ⑨ Vita
- ⑩ Milk Powder
- ⑪ Sugar
- ⑫ Poly tanks
- ⑬ Relocation
- ⑭ Road maintenance

220 sacks per week (per house)  
 60 Bags (week)  
 15 Cans (week)  
 15 cartons (week)  
 15 Tins (week)  
 60 Bags  
 10 bags  
 27 bags  
 3 cans  
 2 Bags  
 2 Bags  
 10 Poly tanks  
 big next year (long term)  
 Road maintenance (per attention)

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① Morris Village  
 ② KPELEX Village  
 ③ Gema Village  
 ④ and Yekandor  
 Chemical pass to water

Signed: A. Gabriel  
 A. U. Gabriel  
 SHAMAN  
 Affected to  
 0775751024  
 contact

⑤ Wetland/ mixing zone:

List of food items developed by the communities

## TEAM II: WATER QUALITY SAMPLING & ANALYSIS

- Team II was charged with the responsibility of assessing the current water quality of the Welegee creek, Marvoe creek and Mafa River
- The team collected water samples from a total of 21 samples covering points covering points from New Liberty Gold Mines (NLGM) TSF to downstream points as far as Robertsport
- During the sample collection, the team was accompanied by BMMC environmental team who took duplicate samples  
(in areas extending to Mafa midstream)

# Water Quality Sampling

- Water samples were collected from 21 locations within the study area;
- Sampling points were selected pursuant to the objective of the study
- Samples included surface water and ground water
- Samples were collected into pre-treated sample bottles, labeled for easy identification and sealed.
- The samples were kept in ice chest with freeze packs.
- Appropriate chain of custody forms were completed in line with the Agency's standard for documentation of samples.
- All samples were transported to the EPA laboratory for analysis

# Sampling Points 1/2

Abbreviated Code	Sample Code	Sample Source/Location
S1	PEN STOCK 6	Penstock 6/Marvo Diversion
S2	TSF R	NL TSF Return Effluent
S3	MB 07	NL Monitoring Well
S4A	CMP 2	NL Compliance Pt
S4B	EDMP-2A	Marvo Creek/NL Monitoring Point
S4C	EDMP-2B	Marvo Creek/ NL Monitoring Point
S5	JAKSW 1	Marvo Creek/Jakandor
S6	JAKSW B	Marvo Creek/Jakandor
S7	MAFA 1	Mafa River
S8	MAFA 2	Mafa River
S9	SP1	Mafa River



# Sampling Points 2/2

Abbreviated Code	Sample Code	Sample Source/Location
S10	SP2	Mafa River
S11	SP3	Mafa River
S12	SP4	Mafa River
S13	SP5	Mafa River
S14	SP6	Mafa River
S15	SP7	Mafa River
S16	SP8	Mafa River
S17	SP9	Mafa River
S18	SP10	Mafa River
S19	SP11	Mafa River

# Analytical Methods used

Parameter	Unit	Methodology
pH	-log H	PH Meter insitu
Free Cyanide	mg/L	Colorimetry DR 6000
Arsenic	mg/L	Palintest (Arsenator)
Iron	mg/L	Colorimetry DR 900
TDS	mg/L	Palintest Multi-meter
Copper	mg/L	Colorimeter DR 890
Nitrate	mg/L	Colorimeter DR 890
Sulfate	mg/L	Colorimeter DR 890
Mercury	mg/L	Cold Vapor AAS

# Sampling Map

**Assessment of water quality at Welegee, Marvoe and Mafa River in Grand Cape Mount County, Liberia**



**Legend**

- Sampling Point
- New Liberty Project roads
- Rivers and streams
- Monrovia-Bc Waterside road
- Lake/Inland water body
- New Liberty Gold Mines

**Author: ERRS Laboratory, EPA-Liberia**

*Date: 07/04/2022/18/2022*

# Laboratory Results 1/5 (values in bold are above permissible limits;

NS = not stated)

Parameter	Unit	S2	EPA Limit	LWQS- Class -III
pH	-log H	6.27	6.0-9.0	5.5-9.0
Free Cyanide	mg/L	<b>0.069</b>	0.022	≤ 0.05
Arsenic	mg/L	<b>0.333</b>	NS	≤ 0.20
Iron	mg/L	<b>1.67</b>	1.5	≤ 2.0
DO	mg/L	<b>4.54</b>	NS	≥5.0
Copper	mg/L	<b>0.121</b>	0.1	≤ 0.2
Nitrate	mg/L	29.4	60	≤ 80
Sulfate	mg/L	11.6	200	≤ 250
Mercury	mg/L	<0.005	NS	≤ 0.01

# Laboratory Results 2/5

values in bold are above permissible limits; NS = not stated; N/A = not applicable

Parameter	Unit	S1	S3	S4A	S4B	S4C	EPA Limit	LWQS-Class -II
pH	-log H	6.74	6.47	6.53	6.48	6.61	6.0-9.0	6.0-9.0
Free Cyanide	mg/L	<0.001	0.002	<b>0.024</b>	0.009	0.005	0.022	≤ 0.02
Arsenic	mg/L	<0.02	<0.02	<b>0.066</b>	0.041	0.038	NS	≤ 0.05
Iron	mg/L	0.007	0.006	0.74	0.51	0.29	1.5	≤ 1.5
DO	mg/L	6.27	N/A	5.18	5.28	5.33	NS	≥5.0
Copper	mg/L	<0.005	<0.005	0.009	<0.005	<0.005	0.1	≤ 0.01
Nitrate	mg/L	0.73	0.27	0.53	0.44	0.49	60	≤ 60
Sulfate	mg/L	<0.005	6.33	3.84	3.77	3.94	200	≤ 200
Mercury	mg/L	<0.005	<0.005	<0.005	0.005	<0.005	NS	≤ 0.01

# Laboratory Results 3/5

( NS = not stated )

Parameter	Unit	S5	S6	S7	S8	S9	S10	EPA Limit	LWQS-Class -II
pH	-log H	6.55	6.59	6.83	6.63	6.55	6.52	6.0-9.0	6.0-9.0
Free Cyanide	mg/L	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	0.022	≤ 0.02
Arsenic	mg/L	0.021	<0.02	<0.02	<0.02	0.022	0.029	NS	≤ 0.05
Iron	mg/L	0.19	0.07	0.01	0.11	0.17	0.08	1.5	≤ 1.5
DO	mg/L	5.33	6.15	6.11	6.09	5.18	5.73	NS	≥5.0
Copper	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.1	≤ 0.01
Nitrate	mg/L	0.40	0.29	0.22	0.18	0.32	0.28	60	≤ 60
Sulfate	mg/L	3.12	0.91	0.18	0.32	0.28	0.22	200	≤ 200
Mercury	mg/L	<0.005	<0.005	<0.005	<0.005	0.007	0.005	NS	≤ 0.01

# Laboratory Results 4/5

values in bold are above permissible limits; NS = not stated

Parameter	Unit	S11	S12	S13	S14	S15	S16	EPA Limit	LWQS-Class -II
pH	-log H	6.55	6.38	6.83	6.18	6.09	6.18	6.0-9.0	6.0-9.0
Free Cyanide	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.022	≤ 0.02
Arsenic	mg/L	<0.02	<0.02	<0.02	<0.02	0.027	0.021	NS	≤ 0.05
Iron	mg/L	0.08	0.05	0.07	0.07	0.17	0.15	1.5	≤ 1.5
DO	mg/L	5.73	5.83	6.14	5.92	<b>4.78</b>	<b>4.52</b>	NS	≥5.0
Copper	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.1	≤ 0.01
Nitrate	mg/L	0.28	0.22	0.19	0.31	0.52	0.72	60	≤ 60
Sulfate	mg/L	0.22	0.11	0.05	0.09	0.18	0.17	200	≤ 200
Mercury	mg/L	<0.005	<0.005	<0.005	<0.005	<b>0.039</b>	<b>0.021</b>	NS	≤ 0.01

# Laboratory Results 5/5

NS = not stated

Parameter	Unit	S17	S18	S19	EPA Limit	LWQS-Class -II
pH	-log H	6.11	6.13	6.38	6.0-9.0	6.0-9.0
Free Cyanide	mg/L	<0.001	<0.001	<0.001	0.022	≤ 0.02
Arsenic	mg/L	<0.02	<0.02	<0.02	NS	≤ 0.05
Iron	mg/L	0.11	0.14	0.10	1.5	≤ 1.5
DO	mg/L	4.98	5.17	5.09	NS	≥5.0
Copper	mg/L	<0.005	<0.005	<0.005	0.1	≤ 0.01
Nitrate	mg/L	0.50	0.63	0.52	60	≤ 60
Sulfate	mg/L	0.13	0.10	0.21	200	≤ 200
Mercury	mg/L	0.010	0.008	0.005	NS	≤ 0.01



# Summary of Laboratory Results

- Analytical results at TSF-R continues to show exceedance in several water quality parameters (free cyanide, arsenic, DO, copper & Iron)
- Generally, there was an appreciable improvement in water quality at all previous sampling points;
- Samples marked SP15 and SP16 reported higher than permissible levels of mercury, indicating likely artisanal activities
- The results obtained herein constitute baseline data for future interventions by the Agency

# Recommendations

- Agency should inform residents of the affected communities especially Jekandor that the auxiliary stream (S6) is safe for use
- Despite the encouraging nature of the results, residents should refrain from using the water resources for the **next 30 days**, after which confirmation laboratory tests will be conducted.

