

**ENGINEERS & PLANNERS
COMPANY LIMITED**



**ENGINEERS
&
PLANNERS**

**BUSINESS PLAN
2023 (CONTRACT MINING)**

SUBMITTED TO:

**INSPECTORATE DIVISION OF MINERALS
COMMISSION
#12 SWITCHBACK ROAD
CANTONMENTS - ACCRA**

FEBRUARY 2023

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1.0 INTRODUCTION

Engineers & Planners is Ghana's leading mining contracting firm that provides mine support services to the Extractive Industry- Gold & Iron Ore. Founded in 1997, Engineers and Planners (E&P) has grown to be a leading indigenous Mining and Construction company in the West Africa sub-region. E&P's main service areas include Mining, Construction & Civil Works, Heavy Duty Equipment Hire, and Consulting Services.

1.1 BACKGROUND

Engineers & Planners Company Limited has been operating as a licensed contract miner on the concession of Goldfields Ghana Limited at Tarkwa and Abosso-Damang in the Western Region. The concessions are south- western Ghana near the southern end of what is commonly referred to as the Tarkwa Basin.

Engineers & Planners Company Limited is currently operating a section of its contract mining operations with Goldfields Ghana Limited at Tarkwa and Damang by loading and hauling ore from the mine to the processing plant of the Company.

1.1.1 DETAILS OF PEOPLE RESPONSIBLE FOR OPERATION

Table 1: Key Staff of the Company

SL/NO.	NAME	DESIGNATION
1	Ibrahim Mahama	CEO
2	Fuseini Yahaya	Senior Safety Officer

1.1.2 DETAILS OF THE CONTRACTOR

The Company's registered office is located at Block 14, Airport Residential Area
PMB CT 152, Accra
Tel:0302518112-6

1.1.3 DETAILS OF MINERAL OWNERS

Goldfields Ghana
Limited
No.7 Dr. Amilcar
Road,
Airport Residential
Area, Accra
Tel: +233-302-770-187

1.2 LOCATION OF CONCESSION

Tarkwa is located in south-western Ghana approximately 300 km by road west of Accra. The Tarkwa mine is located 4 km west of the town of Tarkwa with good access roads and an established infrastructure. The mine is served by a main road connecting to the port of Takoradi some 60 km to the southeast on the Atlantic coast. The Tarkwa mine operates under mining leases covering a total area of approximately 20,800 ha.



Figure 1: Location of the Mine

1.3 Relief and Drainage

The land rises from about 240m to about 300m above sea level with the topography generally undulating with few scarps ranging between 150m and 300m above sea level. The district falls within the forest dissected plateau physiographic region. Precambrian rocks of Birimian underlie the forest dissected plateau.

1.4 Climate

The District is located in the rain forest zone of Ghana and enjoys a wet equatorial climate. It has two rainfall patterns usually from March to July (major season) and from September to November (minor season). The District experiences high rainfall with a mean annual rainfall of 187.83mm. Temperatures are high all year round with significant daily and seasonal variations. The annual average temperatures range between 26°C and 30°C. Humidity varies from 75-80 percent in the wet season and 70-80 percent in the dry season. The soil is deep, open and acidic in many places due to heavy leaching of base from the top soil because of high rainfall, humidity and temperatures. The acidity of the soil reduces the availability of phosphorus, calcium and magnesium.

1.5 Vegetation

The vegetation of the District is tropical rainforest, with the height of trees ranging between 15-40 metres high. The forest is full of climbers and lianas, which are able to reach into the upper tree layer. Economic trees include mahogany, wawa, odum, and sapele among others. Food crops like

cassava, rice, maize and plantain are also grown. The District's major forest reserve is the Bonsa Reserve (Aboso) with 160.58 square kilometres. There are other two reserves; Ben West (Huni-Valley) with 26.00 square kilometres and Nkontoben (Hun-Valley) with 49.98 square kilometres. Activities of illegal mining and other illegal logging are posing a threat to the natural vegetation. Cocoa, oil palm, coffee, rubber, coconut and citrus are some of the major cash crops grown.

2.1 GEOLOGY AND MINERALIZATION OF CONCESSION AREA

2.2 REGIONAL GEOLOGY

The Tarkwa ore bodies are located within the Tarkwaian System, which forms a significant portion of the stratigraphy of the Ashanti Belt in southwest Ghana. The Ashanti Belt is a northeasterly striking, broadly synclinal structure made up of Lower Proterozoic sediments and volcanics underlain by the metavolcanics and metasediments of the Birimian System. The contact between the Birimian and the Tarkwaian is commonly marked by zones of intense shearing and is host to a number of significant shear hosted gold deposits.

2.3 Local Geology

The local geology at Tarkwa is dominated by the Banket Series, which can be further sub-divided into a footwall and hanging wall barren quartzite, separated by a sequence of mineralised conglomerates and pebbly quartzites. The stratigraphy of the individual quartzite units is well established with auriferous reefs inter-bedded with barren immature quartzites. The units thicken to the west and current flow parameters indicate a flow from the east and northeast. Structurally, the Tarkwaian belt has been subject to moderate folding, and at least five episodes of deformation are recognised. The original deposition occurred in a district basin environment with associated low to steep angle normal faulting. Subsequent compression and folding led to development of thrust faults and reversing of previous normal faults. The final stages involved further thrusting in a southwest direction.

2.3 ESTIMATION OF MINERAL RESERVES AND RESOURCES

It is estimated that the project will produce on the average about 201,187 kt of gold in the coming year at the grade of 1.07 g/t.

3.0 MINING OPERATIONS

3.1 INTRODUCTION

3.2 Mining

Tarkwa is a large, established open pit gold mine that utilises selective surface mining methods to optimise the extraction of the sedimentary mineral deposits.

3.3 Mining methods

The mining methodology used is highly selective. The location of the mining areas is defined through the long-term planning process. The boundaries of the pits are pegged out by survey and the area is cleared of bush and topsoil with a bulldozer. The topsoil is relocated for rehabilitation purposes. After clearing, reverse circulation grade control drilling is carried out, and geological models constructed. The short-term plans and forecasts are updated with this grade control information prior to the commencement of mining. From the highest point in the pit, material is free-dug or blasted to the first blasting reference level. Fresh rock and transitional zones are drilled and blasted in 6 m lifts, with excavation in 3 m flitches. Backhoe excavators are used to select waste from the ore, and vice versa, along the sedimentary horizons to an average accuracy of 30 cm on the hanging wall and 20 cm on the footwall of a reef. Pit Geologists and Geotechnicians supervise all digging and mineral material is classified as either Run of Mine (ROM), delivered to one of two primary crushers, or low-grade, which is stockpiled close to the primary crushers. Waste material is hauled to the nearest waste dump.

Truck allocation (dispatching) is by means of the LP-based, GPS assisted Modular Mining Fleet Management System. Management reporting of material movement is via an intranet-based system (MMRS).

3.2 Mining Areas

The company's contract mining operations are conducted at Tarkwa and Damang mines of Goldfields Ghana Limited.

3.3 Land Preparation

The area to be mined is demarcated by using the Services of licensed Surveyors after extensive geological work in the area. The top soft soil is cleared with dozers and stock-piled for future rehabilitation work. The surface area is made as level as possible.

3.4 Mining Sequence

Blasting currently utilises relatively close patterns and small diameter holes, typically a 3.4 m by 3.8 m grid with a hole diameter of 118 mm and a powder factor of 0.75 kg/BCM. Larger diameter holes and an increased grid size will be utilised in the partially weathered material, whilst decreased grid sizes will be utilised in harder material. The small diameter holes are used to preserve, as far as possible, the integrity of the ore/waste contacts for selective mining purposes.

4.0 PROCESSING OF ORE.

The plant which is 500 t/h currently comprises:

- Primary crushing
- Primary SAG mill and secondary ball mill with classification hydrocyclones
- Gravity concentrator
- Flash flotation
- Carbon-in-leach
- Carbon elution and regeneration and electrowinning
- Gold room
- Reagent mixing

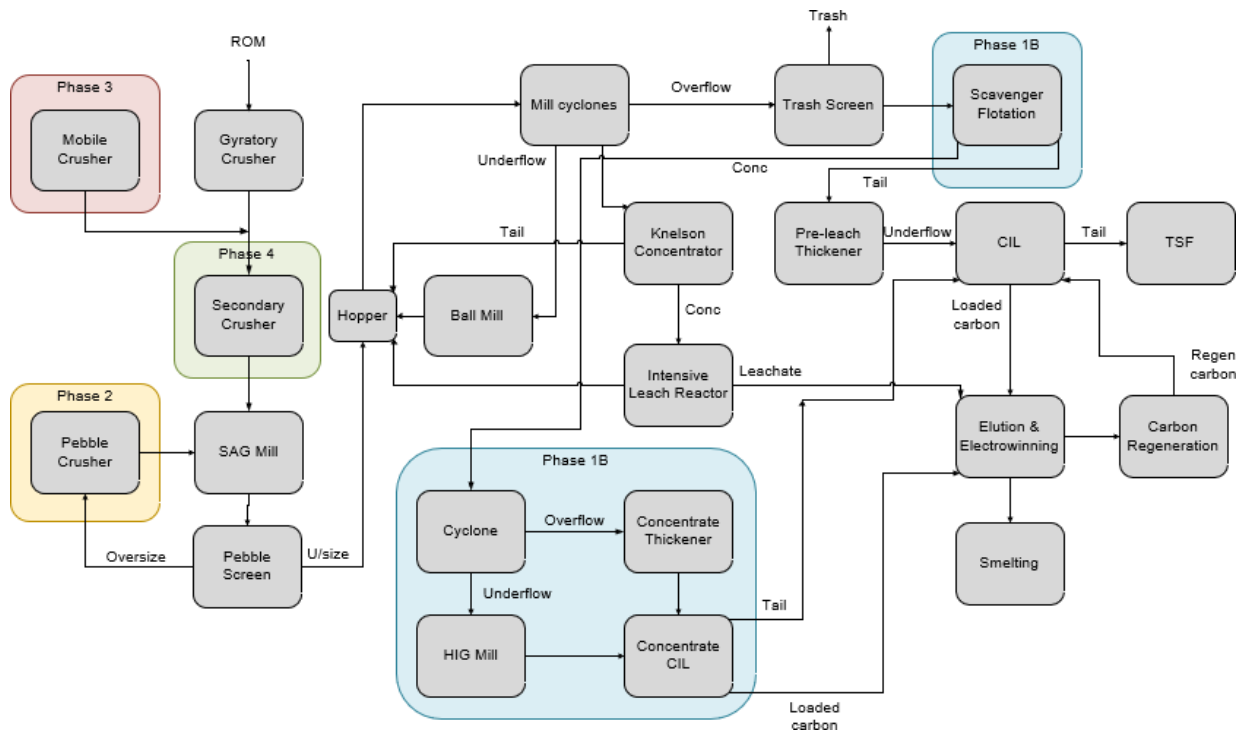


Figure 2: Process Flow sheet of the Gold Mining Process

5.0 Description of Proposed Mine Facilities

The mine facilities and infrastructure will include the following:

- Washing Plant
- Washrooms
- Main Office & Administration Block
- Accommodation Facility for Senior & junior Officers
- Generator Sets
- Fuel Filling stations
- Main Workshop
- Stores

6.0 ENVIRONMENTAL ASPECTS ASSOCIATED WITH THE MINE

6.1 Environmental Policy Statement

Engineers & Planners Company Limited is aware that its activities may have subsequent effects on the environment locally, regionally and on a global scale. This environmental policy has been designed as confirmation that Engineers & Planners Company Limited and all departments and organisations within it, have a responsibility towards all environmental issues and will endeavor to address these through good environmental practice.

- Engineers & Planners Company Limited will identify legislative compliance and corporate guidelines relevant to its business as a minimum requirement and where possible exceed these levels.
- Manage all operations with diligence, remaining aware that the ultimate objective is to protect the environment and prevent pollution. Engineers & Planners Company Limited will employ the best control mechanisms, practices and procedures which are proven technologically sound and economically viable. Senior management will ensure that effective environmental operating procedures are implemented and adhered to in order to mitigate all potential risks to the environment resulting from the business activities of Engineers & Planners Company Limited.
- Ensure the efficient and effective use of energy sources throughout all areas of the business. This is to be achieved through the promotion of energy efficiency to all staff, leading to reduced energy consumption and resulting in reduced energy costs.
- Encourage all current and future use of sustainable supplies and create awareness of environmental and sustainability issues for all staff through employee development and training/ Through effective purchasing policies each project or department will endeavour to invest in clean, energy efficient technologies and resources where cost allows. Engineers & Planners Company Limited will also endeavour to reduce waste produce as far as is practicable, leading to the conservation of natural resources.
- Avoid the unnecessary use of any hazardous chemicals. Promote awareness with regard to the storage of all hazardous chemicals and substances throughout the business. Ensure adequate steps to protect both human health and the environment where the use of such chemicals or substances is unavoidable.
- Periodic monitoring of the objectives as listed and the implementation of regular auditing.
- Encourage any organisation sub-contracting to us to be more environmentally aware and to adhere to our environmental operating procedures whilst working at any of our sites.
- Communicate all policies effectively to all members of staff and sub-contractors alike.

In order that Engineers & Planners Company Limited is able to achieve these aims all those in the business will work towards the following objectives:

- ❖ Observe the applicable laws and regulations of the country as a minimum standard
- ❖ Take account of recognized external codes that others may use these to gauge Engineers & Planners Company Limited's environmental management performance.

- ❖ Communicate meaningfully with government, civil leaders and other stakeholders, to develop a mutual understanding of environmental management issues and performance.
- ❖ Ensure that environmental management plans are integrated with day-to-day activities, safe work practices and appropriate levels of community engagement.
- ❖ Select and develop, employees including service providers and suppliers, with the appropriate competencies to deliver to the level required to meet set environmental standards.
- ❖ Provide sufficient resources to achieve the levels of environmental management protection required including capacity for continuous improvement.
- ❖ Establish accountabilities for environmental protection accompanied by measurable objectives, targets and performance indicators.
- ❖ Engage in activities that enhance the capabilities of Engineers & Planners Company Limited environmental management performance.
- ❖ Report on environmental management performance and progress regularly and appropriately to shareholders and other stakeholders.

6.2 SLIME DISCHARGES

Slime from the tertiary sluice boxes are directed through channels into the slime dam. The silt is allowed to settle and is loaded into trucks for dumping. The dumped material is subsequently used for reclamation. The effluent which is relatively devoid of slimes flows through return pipes into a series of water dams before ending up at the final intake dam. The clean water to feed the plant takes its source from this return water pump station.

6.3 AIR QUALITY MANAGEMENT

The main sources of impacts with respect to air quality are dust emissions as a result of movement of haulage trucks and other vehicles, exhaust fumes from haulage trucks and mining activities.

Dust suppression on the haul roads and access roads is done by using a water bowser.

Drivers have been advised to drive within 'the stipulated speed limit (30kph) to reduce dust emission. All road users are to observe road signage and drive according to the road and weather conditions. Mining equipment are serviced to maintain their engines in good condition to minimize emissions. Workers have been provided with dust mask to prevent inhalation of respirable dust into their lungs".

6.4 NOISE AND VIBRATION MANAGEMENT

Noise from the plant, mining equipment (haulage trucks, dozers, front end loader and excavators) are the main sources of noise impact on the field. The equipment are maintained to minimize noise generation and vibration.

Employees have been provided with Personal Protective Equipment (PPE) e.g. ear plugs, boots, gloves, and helmets, rain suits to minimize and mitigate the effect of noise emission. Noise zones have been identified and appropriate signage installed to caution employees to use PPE. Employees are also educated on the effect of noise on their health (noise induced hearing loss) as a motivation for them to protect themselves against noise.

6.5 FIRE MANAGEMENT

The mine has arranged with the Ghana National Fire Service to provide fire safety training and education for employees during the year. Toolbox talks are held to educate employees on fire preventative measures such as no overloading of electrical circuits, good housekeeping practices, use of portable fire extinguishers, no open burning.

Fire safety signs e.g. Exit signs at offices, "No Smoking" have been posted at vantage points. Mandatory signage has been posted at the fuel filling station.

Fire extinguishers have been provided in vehicles, heavy trucks and other mining equipment as well as at various locations on the mine site including the plant, administration offices, kitchen and generator locations.

Emergency assembly areas have been designated at various locations on the mine for the purpose of mustering in an event of an emergency and also during fire drills.

6.6 WASTE MANAGEMENT

Waste generated on the mines include: - waste rock, scrap metal, fine plant undersized material, waste oil, fuel filters and waste fuel from the workshop domestic waste (paper, food waste etc.).

Dust bins have been provided at vantage points to collect domestic waste for final disposal at designated waste dumping site. Cleaners have been assigned to empty dustbins, clean water closets and washroom daily.

Waste rock is used for road construction. Some of the waste rock is given to the communities for their use. Waste oil is drained into drums and stored and given to accredited vendors as well as some community members for their use. Oil filters are drained of the oil and dumped into a designated pit and buried when full. Scrap metal are gathered and sold to scrap metal dealers.

6.7 LANDSCAPE DEGRADATION MANAGEMENT

All mined out areas will be reclaimed. Grasses will be grown at the plant site and disturbed areas to check erosion.

Seedlings will be planted around the water dams to provide shed and prevent dams from drying up.

7.0 HEALTH AND SAFETY

Employees are given safety training and education through toolbox meetings. They are trained in hazard identification and risk assessment to guide them in their work to prevent incidents. Serious illnesses and injuries are referred to either Bibiani Government Hospital.

Workers have been provided with the required PPE (safety boots, helmet, rain suits, gloves, goggles etc.) to protect themselves. They have also been provided with insects repellent to prevent insect bites whilst outdoor. Employee doing special works such as welding are provided with special PPE such welding goggles for eye protection, gauntlets for their feet and aprons for the body. Appropriate safety signs are installed to caution or instruct employees on safety measures. Rotating parts of machines e.g. Conveyors have been provided with guards.

Audible start-up alarms have also been installed to warn employees.

Mobile equipment are provided with backup alarms to warn employees when the equipment are reversing.

7.1 COMPANY'S POLICY ON OCCUPATIONAL HEALTH AND SAFETY

ENGINEERS & PLANNERS COMPANY LIMITED acknowledges its duty as an employer and aims to ensure the occupational health, safety and welfare of all its employees and contractors as well as ensure that all efforts are made to safeguard its visitors and members of the public who may be impacted by its activities.

ENGINEERS & PLANNERS COMPANY LIMITED observes Occupational Safety and Health Policy for Ghana, 2004 (Draft) and other relevant legislation and internationally accepted norms and is committed to the:

- ❖ Provision and maintenance of fit for purpose plant and equipment that is safe and without risks to health.
- ❖ Assurance for safety and health in relation to the use, handling, storage and transportation of hazardous substances.
- ❖ Provision of sufficient information, instruction, training and supervision as necessary, aiming to ensure the health and safety of its employees at work.
- ❖ Maintenance of a safe place of work and provision and maintenance of a safe means of access to and egress from that safe place of work. ENGINEERS & PLANNERS COMPANY LIMITED undertakes to provide adequate security for the work environment.
- ❖ Investigations of incidents causing injury, property damage, near-misses or non-conformances and will make the findings of such investigations fully available to external legislative agencies as may be required.
- ❖ Availability of adequate resources to promote and maintain high standards of health and safety management.
- ❖ Consultation with employees during regular safety meetings with the intent to continuously review and improve our health and safety practices.
- ❖ Creation and development of a culture that has health and safety as an integral part of all operations and all performance management systems.

- ❖ Inclusion of health and safety performance into an individual's annual performance review

Specifically, the Company's Health and Safety is to;

- Ensure that as a minimum, the company will be compliant to all Health and Safety legislation of the countries within which we operate;
- Provide the resources required to meet, and where possible exceed, relevant legislative requirements and standards;
- Ensure that all levels of management are adequately trained and held accountable for implementing and promoting Health and Safety standards;
- Ensure that individual and management DUTY OF CARE responsibilities are well understood and diligently discharged by all Employees;
- Promote consultation and cooperation between management and Employees, government, clients and sub-contractors, for the effective implementation of Health and Safety standards by all parties;
- Continuously improve upon Health and Safety performance through the effective implementation of systems to identify, assess, monitor and control risks at the workplace.

8.0 WORK FORCE

The proposed work force of the company for operations to commence is envisaged to be 1174 personnel summarized on the table below:

Table 2: Summary of work force.

Work Category	Ghanaians	Expatriates
CEO	1	
Executive Secretary	1	
Operations Director	1	
Business Development Director	1	
HR Director	1	
Chief Accountant	1	
Managers	11	
Mechanics	204	
Electrician	44	
Operators	636	
Drivers	16	
Others	257	
TOTAL	1174	

9.0 MAJOR EQUIPMENT AND MACHINERY

Table 3: List of Major Equipment & Machinery to be used for the Projects

No.	Item	Quantity
1	Fuel Tanks	3
2	Genset	4
3	Grader	3
4	Integrated Tools	2
5	Light Vehicle	14
6	Lighting Plant	5
7	Loader	6
8	Dump Truck	21
9	Excavators	10
10	Forklift	2
11	Backhoe	3
12	Coaster Bus	1
13	Compactor	2
14	Compressor	11
15	Dewatering Pump	6
16	Dozer	5
17	Drill Rig	3

10.0 CONCLUSION

The Management of Engineers & Planners Company Limited recognizes the benefits of improved environmental and safety performance and will strive to keep the highest environmental standards and continually demonstrate its commitment towards improving its mining operations.

ENGINEERS & PLANNERS COMPANY LIMITED will continue to take the necessary measures to control and maintain a high standard of occupational health and safety. The company is therefore adequately equipped to deal with any unforeseen challenges that may arise.

It is envisaged that the company will be compliant with all local legislations and International Best Practices within the mining sector.