NEERIKA HOLDING AND GENERAL SUPPLY LIMITED

P RE - FE ASI BI L I T Y STUDY F O R ESTAB L I S HI NG A N D O P ER ATI N G G O LD PROCESSING P L AN T AN D E LUSI O N P L A NT

10-OCT-24	NEERIKA HOLDING AND GENERAL SUPPLY LIMITED

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10.0 THREATS TO PROFITABILITY AND RUNNING OF THE PROJECT

1.0 EXECUTIVE SUMMARY

This report represents an objective analysis of the overall viability of engaging in gold mining and processing using crushed gold ore and tailings as the basic raw materials; and provision of technical support services to small scale miners in Geita region. The project is being promoted by Neerika Holding and General Supply Limited, a newly incorporated company registered in the United Republic of Tanzania under the companies Act (Act No. 12 of 2002) on 8th December 2016 holding Certificate of Incorporation No. 131795 formed for the main objective of establishing facilities for gold processing activities in the country. To facilitate implementation of the proposed project Neerika holding and General Supply Limited holds a Primary Mining License has entered into a joint venture partnership with a local partner, in Geita region to the effect that will provide the mining and processing site in the form of Mining Licence No. ……. located at Nyarugu Area, Geita Region.

Tanzania has become one of the fastest-emerging gold producers in Africa, and is now the continent's third-largest gold-producing country after South Africa and Ghana. Tanzania produced 48.4 tonnes of gold in 2019, up from 39.3 tonnes the previous year. Tanzania gold mining has surged by more than just 700 per cent in the last twenty-five years, beginning from 5 to 40 to 50 tons a year; meanwhile, South Africa's gold mining decreased from more than 500 tons in 1990 to a significant low of 117 tons in 2018.

The price of Tanzania gold generated by vast-scale miners totalled 10,009.6 kilograms for a net value of $469.0 million in the first half of the year ending in March 2021. This reflects a minor decline from 11,130 kilograms and a worth of $477.58 mil in the same period in 2020.

Tanzanian gold stocks are believed to be in the range of 45 million oz. The greenstone districts near Lake Victoria have focused on gold prospecting, with numerous substantial resources previously discovered and developed.

Tanzania gold shipments totaled $2.2 billion in 2019 and $2.9 billion as of 2020, accounting for over 90 per cent of the nation's mineral exports. Exports of gold have surged by 83 per cent in the last five years, reaching
$1.2 billion by 2015. Tanzania gold is primarily exported to India, South Africa, and Switzerland

The mining sector in Tanzania contributes significantly to the country's economy. In 2020, mining and quarrying accounted for approximately 7% of the Tanzanian GDP, employing

over 310,000 people. The country's earnings from mineral exports exceeded 3.6 billion U.S. dollars. Gold is the leading foreign exchange earner in Tanzania. Since 2015, the mining industry has been increasing its contribution to the country's economy. It was projected to account 10 per cent in 2025 as stated in the Development Vision 2025. It is one of the leading components in generating foreign exchange earnings within the non-traditional exports. Further is has great potentials for employment opportunities and spearheading for both the forward and backward linkage of the Tanzania's economy.

- Gold found in greenstone belts located in the east and southern of Lake Victoria, and rock formation in southern and southwestern of the country;
- Base metals found in a belt running from Kagera through Kigoma to Mbeya, Ruvuma and Mtwara regions, and,
- Gemstones, which are found in eastern and western belts running from Kenya border in the northern part to Mozambique in the south and Mbeya and Rukwa regions.
- Gold and diamonds have always been the mainstay of the country's mineral production.

1.0.1 The Project Concept

The proposed project entails design, finance, development, construction and engagement in direct gold shaft mining activities to obtain gold ore to be crushed and processed to produce gold a cyanidation gold processing plant, applying Carbon-In-Pulp gold extraction technique. Maximum processing capacity of the plant is estimated at 33,600 metric tons per annum in three (3) eight (8)-hour shifts. Recovery rate has been estimated at four (4) grams per ton.

1.0.2 Objectives of the Study

The objectives of this study are three fold. The first is to work out and determine technical, commercial and financial viability and operational feasibility of the project of the proposed medium gold mining and processing project. The second to facilitate the promoters secure funds in form of long term facility at the tune of US$ 371,450- from a local development/commercial bank in order to facilitate development of the mining and processing facilities; as well as financing initial capital requirements. The third objective is to facilitate the application for Tanzania Investment Centre (TIC) Certificate of Incentives to access fiscal and non fiscal incentives as statutorily provided for under Tanzania Investment Act (1997) for the proposed project.

1.0.3 Scope of Assignment

The scope of the assignment includes standard requirements of a techno- economic feasibility study to facilitate appropriate investment decision. Hence such a study carried out professionally for this study must include, among others:

- Review of location and proposed site;
- Construction costs: mining and processing sites, buildings, structures and civil works;
- Capital and deemed capital requirements, including machinery, tools, equipment
- Gold processing requirements (main raw material, processing chemicals, processing costs etc.)
- Labour requirement and costs
- Maintenance requirements and provisions made in the major capital items;
- Financial and economic analysis
- Developmental Values/Economic Benefits
- Risk Analysis
- Review of Environmental Aspects;
- Project management and implementation schedule.

Most of the data has been complied by the promoters' own research and study and therefore is first-hand information. On the other hand, Environmental Management Plan and all environmental aspects referred to under this study were provided at our request Consultants from their experience on similar Environmental Impact Assessment (EIA) carried out elsewhere..

The financials have also been carried out on the basis of market and cost information provided by the promoters of the project.

1.1 LAYOUT OF THE STUDY.

This report presents the Techno – economic and financial feasibility for setting up/operating a medium scale gold mining and processing project with operations based at Nyarugusu Village, Geita District, Geita Region.

The report is organised in 12 chapters. The Executive Summary is dealt with in this Chapter 1, followed by the mining Business Environment in Tanzania in Chapter 2. Chapter 3 deals with the project details (project concept, location and infrastructure, ownership, investment costs and financing plan). Chapter 4 provides technical aspects of the project (gold production process, logistics and supply of raw materials and inputs, raw materials requirement and availability, production costs and revenue estimates, environmental aspects and project implementation schedule).

Chapter 5 highlights the relevant Policy and Legal Framework for the plant operations and Chapter 6 deals with relevant standards for industrial operations while Chapter 7 outlines the Environmental Management Plan (environmental protection commitments, control strategies and performance etc.).

A brief account on the manpower requirements and organization structure is as dealt with in chapter 8. Chapter 9 deals with project Financial Analysis (estimated capital cost and basic operating assumptions, and analysis of financial results). Chapter 10 covers Threats to Profitability and Running of the Project (risk analysis looked from the strengths and weaknesses of the project environment). Chapter 11 deliberates on the Development Values/Economic Benefits (social and local economic benefits emanating from the project). The report ends with conclusion and recommendations in Chapter 12.

1.2 PROJECT SPONSORS

The proposed gold mining and processing project is being promoted by Neerika Holding and General Supply Limited, a private company incorporated in the United Republic of Tanzania for the sole purpose of implementing the envisaged gold mining and processing project in Tanzania. The shareholders of Neerika Holding and General Supply Limited Limited are as shown in Table 1 below:

NAME	NATIONALITY	NO. OF SHARES	% SHAREHOLDING
1. RICHARD KASUBI MFUNGI	TANZANIAN	300	33.33%
2. KASUBI MFUNGI	TANZANIAN	300	33.33%
3. NEEMA ALPHONCE MAKUYA	TANZANIAN	300	33.33%

1.3 LOCATION AND INFRASTRUCTURE

The project is located at Nyarugusu Village, Geita District in Geita Region and the site is directly accessed from Geita Centre. The plant obtains its water from its own borehole. The main source of energy for the plant facility is electricity generated from power generators. The facility however is not connected to sewage system, the site use its own septic tanks as temporary storage system which, when full will be taken to municipal council waste stabilization ponds for final disposal.

1.4 PRODUCTION PROCESS (TECHNOLOGY)

Neerika Holding and General Supply Limited plans to employ state-of-the-art gold mining and processing small scale facilities. The proposed processing technology to be used under this project is Carbon-In-Pulp (CIP) gold extraction technique for recovery of gold liberated into a cyanide solution as part of gold cyanidation process. The technology behind this plant is superior to current leaching plants in Tanzania. The company will import its mining and processing technology from China.

1.5 PLANT CAPACITY UTILISATION AND GOLD PRODUCTION

The company envisages development of shaft mining facilities and construction and installation of gold processing and recovery plant with an installed processing capacity of 100 metric tons of gold ore per week worked in 24 hours with 8-hours shifts per day. Plant Capacity Utilization is estimated at 65% in the first year, raising to 70% in the second year before stabilizing at 75% from year three onwards. Under these assumptions, gold ore mining and processing will be at 8,640 tons per annum in year one, 9,360 tons in year two, and 10,080 tons per annum from year three onwards. At the assumed gold recovery rate of four (4) grams per ton, gold production is estimated at 34,560 grams in year one, 37,440 grams in year two, and 40,320 grams per annum from year three onwards.

1.6 RAW MATERIALS REQUIREMENT AND AVAILABILITY

The basis of revenue computations are on estimated gold recovery rate which has been projected at an average of 4 grams per ton of gold ore, translating into

estimated recovery of 13,440 grams of gold per annum. Revenue per gram is estimated at US$ 88 Total revenue per annum is therefore estimated at a maximum of US$ 1,182,720- when the plant is operating at 100% capacity utilization. Actual capacity utilization is assumed at 65% during the first year, 70% during the second, before it stabilises at 75% from the third year onwards. Actual production is therefore estimated at
Processing chemicals required for the process are sodium cyanide, lime, silver nitrate, carbons, potassium iodide, POP, chloride exide and hydrochloric acid.

1.7 PRODUCTION COSTS AND REVENUE ESTIMATES

Direct Costs

The major costs under this project are:

Raw Materials (Gold Ore): gold ore mining is estimated to cost US$ 37 per metric ton.

Gold Ore Crushing Costs: this involves the cost of running the crusher. The crusher is estimated to consume 30 litres of fuel and oils per three-shift day, 6 days a week.

Processing Costs: the cost of running the processing plants are simply application of chemicals in the CIP leaching tanks.

Elution Costs (Mwanza City): the activated carbons will be processed in private elution plants where a processing fee will be paid to the plant owners.

Repair and Maintenance: It is projected to cost 5% of the cost of all major assets per annum.
Labour Cost: The project plans to recruit and employ regular employees (26) including crusher operators, processing plant operators, Plant Technicians and Security Guards on permanent and pensionable terms. It will also employ about 18 General Workers. Labour cost is estimated at 9.6% of gross sales revenue.
Fuels & Oils: Will be required in running power generators, mining equipment and motor vehicles. It is estimated that 18,000 litres will be required per annum which is computed at US$ 18,000- per year.

Revenue Estimates

Gold processing is projected at 8,640 tons per annum in the first year, 9,360 tons in the second and 10,080 tons from year three onwards. Gold production is estimated at an average of 4 grams per ton. Carbon-In-Pulp (CIP) gold extraction process. Revenue per gram is estimated at US$ 88.00 before deducting royalty of 5%. This translates to a revenue of US$ 3,041,280- in year one, US$ 3,294,720 in year two, and US$ 3,545,160 - from year three onwards.

1.8 ESTIMATED INVESTMENT COSTS AND PROPOSED FINANCING

The project is estimated to cost US$ 917,000- (excluding initial working capital of US$ 100,000-) as given in Annex II & V and summarised here below:

S/N	Item	US$
1.	Land & Buildings	235,000
2.	Plant Machinery and Equipment	494,000
3.	Utility Motor Vehicles	115,000
4.	Furniture, Fittings and Office Equipment	15,000
5.	Pre-operational Expenditures	38,000
6.	Contingencies	20,000
	Total	*917,000*
7.	Add: Initial Working Capital	100,000
	GRAND TOTAL	1,017,000

It is proposed to finance the Fixed Investment costs of this project through a combination of equity contribution and bank loan in the following pattern:
(IN US$)

Source	Amount	As % age of total
Sponsors Contribution	545,550	59%
Term Loan	371,450	41%
TOTAL FINANCING	917,000	100%

1.9 ORGANISATION AND MANAGEMENT

The project will be managed through the Board of Directors. The day to day management of the company will be vested in the management team to be headed by a Managing Director. The Managing Director will be directly assisted by two line managers who will further be assisted by four Senior Supervisors responsible for the plant, workshop, purchasing and administration. These will in turn be assisted by qualified and experienced personnel.

On implementation of the proposed project, the company plans to employment up to 44 people in the next three years.

1.10 PROJECT IMPLEMENTATION

Neerika Holding and General Supply Limited plans to import mining equipment and expand its processing capacity to meet the project goals. The company plans to bring in the plants soon after being granted TIC accreditation. Assuming that all things run according to plan, the company should start mining operations by January 15th 2025 at the latest.

1.11 FINANCIAL PROJECTIONS AND EVALUATIONS

Annex VI of the attached Financial Projections forms analyses the Total Production Costs, Annex XII analyses Income Statement Projections while Annex XIII deals with Break-even Analysis as summarised hereto below. The analysis is well elaborated in the attached projections and summarised as follows:

- Internal Rate of Return on investment 22.20%
- Internal Rate of Return on equity 24.29%
- The Normal Payback Period is 4.94 years at zero discount rate and 6.00 years when discounted at the assumed discount rate of 8%.

- Breakeven Point ranges between 65.95% and 2.95%

1.12 ENVIRONMENTAL CONSIDERATIONS

Neerika Holding and General Supply Limited operations will have a minimal impact on the environment of the area. Processing water and chemicals wastes from mining operations can pose a threat to the environment and health of nearby communities. Not only can this waste be harmful if it leaches into ground water, but it can also mean losing minerals still contained in the residue. To prevent this, the project operations will use storage methods to contain the toxic elements. Storage ponds will be constructed at the project site to store slurry, the by-product of gold processing.

1.13 PROJECT DEVELOPMENT VALUES/BENEFITS

Implementation of this project will lead to realisation of the following development values/ social and economic benefits.

- Direct job creation in the region of 44 in the proposed processing and refinery sites. A high proportion of the investment will be spread widely to remote communities that are in desperate need of jobs and investment.
- The operations will significantly add value to current artisanal miners by replacing artisanal mining techniques to modern techniques as part of technical support by the company.
- The village in which the mining operations will be taking place will also see a number of benefits besides the creation of jobs in the form of social services from the company's Corporate Social Responsibility. When boreholes are sunk on site to allow extraction of water for the process, boreholes will also be provided for the village, increasing their access to fresh water.
- The project involves transfer of technology to Tanzania. Tanzanians will be trained on the job on how to extract gold using modern gold processing techniques.

1.14 CONCLUSION AND RECOMMENDATIONS

The project is:

- technically feasible

- financially viable
- economically viable
- socially desirable
- environmentally sound, sustainable and manageable

In view of the global growing demand for gold and the benefits associated with this project as indicated in this report, the project is therefore strongly recommended for financing and subsequently implemented without unnecessary delays.

2.0 BUSINESS ENVIRONMENT AND BACKGROUND

Tanzania has a unique geological environment that hosts a variety of economic minerals. The most famous deposit is the Lake Victoria Greenstone belt in the central and north-central part of the country. Gold discovery and exploitation by German colonialists started towards the end of the 19th century and lasted until the First World War. During the British colonial era (1918-1961) mineral production and revenue were mainly from gold, diamonds, lead, mica, salt and tin. Gold was at a peak level in 1940 when it contributed to about 90% of the value of the mineral production. Following independence in 1961, many industrial sectors including the mining industry, were nationalised by the government.

In 1986 Tanzania agreed to a structural adjustment programme designed by the World Bank. Internal and external trade was liberalised, and the government opened up for foreign investment in the country. The liberalisation of mining,

accompanied by the legalisation of the buying and selling of gold and gemstones through banks and designated dealers, had immediate effects.

Now Tanzania has become one of the fastest-emerging gold producers in Africa, and is the continent's third-largest gold-producing country after South Africa and Ghana. A number of large international mining companies (Barrick Gold Corporation, AngloGold, Ashanti Mining, Resolute Limited) are now involved in operations in the country.

However the sector most relevant to operations conducted by Neerika Holding and General Supply Limited will be the medium scale. Estimates for the number of small scale miners operating in the country are usually taken to be around 500,000 people. There are approximately 6000 small scale claim holders for gold in Tanzania. Assuming the number of people employed on each site is between 30 and 60. This leads to an estimate of 270,000 people working on government sanctioned claims. There are also a large number of miners working on non-government sanctioned claims. Currently in Tanzania there is a dichotomy between the large multinational mining companies and the artisanal miners. Neerika holding and General Supply Limited will seek to exploit this dichotomy. It will operate in a way that will add value to artisanal miners while not troubling the larger mining companies.

There are a small number of companies that are carrying out similar gold leaching operations in Tanzania. These companies have appeared in the last few years following the gold price rises of 2005 where such business models became feasible. Pioneers of this business include M/s Mineral Extraction Technologies Ltd. Their leaching operation is based near Geita approximately 100km south west of Mwanza with another leaching plant 40 km north of their current plant. There are also operations based in Ushirombo and Kahama by M/s Dynamic Mining, and a leaching plant at Igurubi by MMS Limited near Nzega. More companies of similar operations have increased in the last five years. (See the figure below).

The small to medium scale gold leaching market in Tanzania is still clearly in its infancy. Most of the companies operating started as small scale mining operations that sought to employ leaching as a method of improving yield from the mined ore.

3.0 THE PROJECT

3.1 The Project Concept

3.1.1 The Business Activities

The proposed project entails design, finance, development, construction, establish and operate a cyanidation gold processing plant using gold tailings as the raw material by applying Carbon-In-Pulp gold extraction technique. Maximum processing capacity of the plant is estimated at 700 metric tons per week in three (3) eight (8)-hour day-shifts. Recovery rate has been conservatively estimated at four (4) gram per ton.

Other major capital expenditure will involve procurement of dump trucks for transportation of the raw materials, laboratory equipment for metal testing, environmental protection plant, workshop tools and equipment, power generators; purchase of utility motor vehicles, furniture and fittings, and fencing of the project sites.

3.1.2 Responsibilities of a ML Lessor

The project involves a joint venture agreement with a local investor who undertakes to provide the mining and processing site in the form of Primary Mining Licence No. ML 313 located at Nyarugusu Village, in Geita District The local partner will further be responsible for the management of this ML.

3.1.3 Responsibilities of Neerika holding and general supply Limited

M/s Neerika holding and general supply Limited shall be solely responsible for the designing, financing and implementation of the mining and cyanidation gold processing plant on the land. Neerika holding and general supply Limited will further be responsible for the development of the gold processing camp, importation ore processing equipment, technology and skilled personnel, machines and plant processing equipment, as well as engineering works for construction and installation of the cyanidation gold processing plant and establishing a laboratory for metal testing. Other major capital expenditure will involve procurement of workshop tools and equipment, power generators; purchase of utility motor vehicles, furniture and fittings, and fencing of the project sites.

3.1.4 Processing Licence

The company intends to obtain a gold processing licence from the Lake Zone Mineral Office in Geita which will allow them to process gold and eventually semi-refine the gold so obtained into bars/bullions.

3.1.5 Project Implementation Activities

Implementation of the proposed project will involve the following major activities:

- Site preparation and development including sinking of a borehole, construction water reserve dam and tailings slurry storage ponds;

- Development of civil works, structures and buildings, including construction of residential camps and facilities for key staff, office building, staff canteen and facilities for workers, and storage facilities for materials and equipment;
- Importation and installation of gold processing plants, including ball mill plant, CIP plant, laboratory for metal testing etc.;
- Establishing a workshop and acquisition of workshop machines, tools and equipment;
- Acquisition and installation of ancillary infrastructure including heavy duty power generators, installation of security system etc.;
- Procurement and installation of environmental protection plant equipment
- Procurement of heavy duty trucks fleet for transportation of gold tailings from the small scale mining centres to the processing. Other utility vehicles will include pickups, 4-WD station wagon and motorcycles to facilitate movement.
- Purchase of furniture and office equipment;
- Fencing of the site compound and storage yard.

3.2 Location and Infrastructure

As stated elsewhere, the project is located at Nyarugusu Village, Geita District in Geita Region. The plant will obtain its water requirements from its own borehole. The facility will have water storage tank (underground reservoir) with a holding capacity of 150,000 litres of water and one underground concrete tank with 20,000 litres capacity. The average water consumption for both production process and domestic use in the plant is approximately 80 cubic metres per month.

The main source of energy for the plant facility is electricity generated from own power generators. Likewise, the facility is not connected to sewage system, the site use its own septic tanks as temporary storage system which, when full will be taken to municipal council waste stabilization ponds for final disposal.

3.3 Ownership

The project is promoted by Neerika Holding and General Supply Limited, a locally registered private company incorporated in the United Republic of Tanzania for the sole purpose of engaging in gold processing and refinery in Tanzania. The company is registered with authorized capital of 100,000,000/= (One Hundred Million) divided into 10,000 shares of TShs 10,000/= each.

THE SHAREHOLDERS

NAME	NATIONALITY	NO. OF SHARES	% SHAREHOLDING
1. RICHARD KASUBI MFUNGI	Tanzanian	300	33.33%
2. KASUBI MFUNGI	Tanzanan	300	33.33%
3. NEEMA ALPHONCE MAKUYA	Tanzanian	300	33.33%

The directors and shareholders of the company are experienced business people in mining and mineral processing.

3.4 Estimated Investment Cost and Financing Plan

The project is estimated to cost US$ 917,000- (excluding initial working capital of US$ 100,000-) as given in Annex II & V and summarised here below:

S/N	Capital Item	US$
1.	Land & Buildings	
	Site Preparation and Development	15,000
	Construction of Mining Camp and Processing Buildings, Storage Facilities, and Workshop Building	60,000
	Construction of Office Buildings	35,000
	Construction of Staff Quarters, Security Shed and Generator House	70,000
	Development of Infrastructure (boreholes, underground reservoir, overhead tanks, waste water disposal/septic tanks etc) and Civil Works Structures	55,000

	Sub total	*235,000*
2	Plant Machinery and Equipment	
	Back Hoe and other Mining Equipment	124,000
	Gold Ore Crushers	92,000
	CIP Gold Extraction Plant	95,000

	Power Generators (7.5 kW)	80,000
	Air Compressors	27,000
	Workshop Machines, Tools and Equipment	25,000
	Laboratory Kits for Metals Testing	15,000
	Environmental Protection	26,000
	Security System	10,000
	Sub total	*494,000*
3.	Utility Motor Vehicles (dump trucks, pickups, station wagons etc.)	115,000
4.	Furniture, Fittings and Office Equipment	15,000
5.	Pre-operational Expenditures	38,000
	Contingencies	20,000
	Total	***917,000***
6.	Add: Initial Working Capital	100,000
	GRAND TOTAL	**1,017,000**

4.0 TECHNICAL ASPECTS

4.1 Cyanidation Gold Processing Technology

4.1.1 Introduction

Various methods such as gravity concentration, flotation, panning, pyro- metallurgy, cyanidation etc. are available for the extraction of gold metal from its ores. Amongst these methods, cyanidation is the most common method used in the leaching of gold from the ore. This process involves the dissolution of gold containing ores in dilute cyanide solution in the presence of lime and oxygen.

The common processes for recovery of gold solution include:

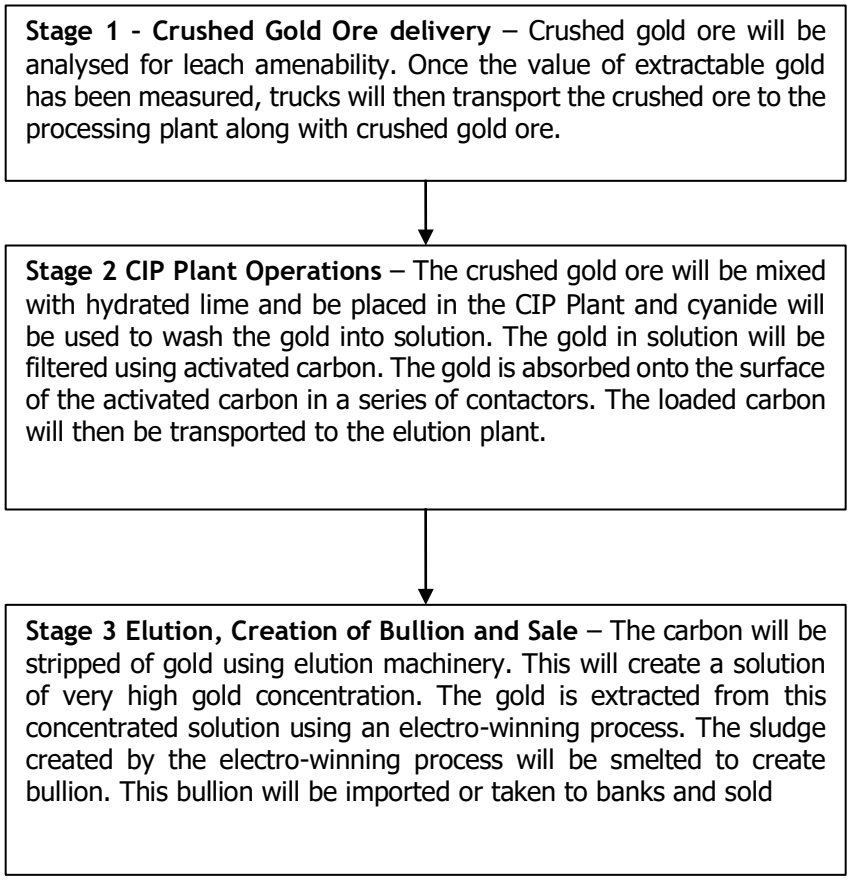
(i) Carbon adsorption,
(ii) Merrill-Crowe process,
(iii) Electro-winning and
(iv) Ion-exchange / solvent extraction.

4.1.2 Carbon-In-Pulp (CIP) Technique

Carbon in Pulp (CIP) is an extraction technique for recovery of gold which has been liberated into a cyanide solution as part of the gold cyanidation process. The CIP method involves creating ore slurry and directly contacting the activated carbon with the gold containing slurry in an agitated environment.

4.1.3 The Process

The business will be broken down into three stages or "gold flows". The first stage will be that of the delivery of gold ore to the leach plant. The second stage will be the leaching process that will take place at the CIP plant. The third stage will be the elution of gold and creation of the bullion that will be sold to local buyers or exported.



4.1.4 Logistics and Crushed Ore supply

The first stage in the process of creating the bullion will be the sourcing of the gold ore to be processed. Scouting will be carried out and samples taken from piles in various areas around the mining site. These samples will be analysed to measure their leach amenability and their effective value to the company. Once this has been done, the trucks will be organised to collect the gold ore and take them to the processing plant site. Gold ore will then be crushed by company crushers at the processing site. During the start up phase, only a few trucks will be required to fill the small number of tanks available. Once the plant is operating at full capacity, two 25 Tipper Trucks should be sufficient for supplying the plant with the required amount of gold ore.

One important factor will be to build up and maintain an on-site gold ore stock pile. This will ensure a steady and reliable flow of crushed ore to the plant. There will always be occasions when roads are made impassable by bad weather, or

when trucks are being serviced or repaired. It would be wise to maintain a pile of at least 500T of gold ore at the processing site. During the wet seasons it may be reasonable to increase this stock pile to 1000T.

4.1.5 Leaching and the Cyanidation process

4.1.5.1 The Cyanidation Process

The solubility of gold in cyanide solutions was recognised as early as 1783 by Scheele (Sweden) but wasn't implemented for commercial purposes until 1888 in the USA. At this time a zinc cementation process was used to extract the gold from the gold bearing solution. At a later time, following significant advances in this method, this process was named the Merrill-Crowe process.

The absorption of gold from aqueous solutions onto activated carbon was first noted in the early 19th century. However, at this time the only known way of extracting the gold from the carbon was by combustion of the carbon and smelting of the resulting ash. This was costly and given the advances made in the zinc cementation process, was not used. It wasn't until the 1950s when the Zadra process was developed to strip gold from activated carbon that the use of activated carbon became widespread. However the low gold price during this era restricted developments. It wasn't until the gold price boom of the 1980s that saw the development of the two major processes that are used widely today.

4.1.5.2 The Carbon-In-Pulp (CIP) Process

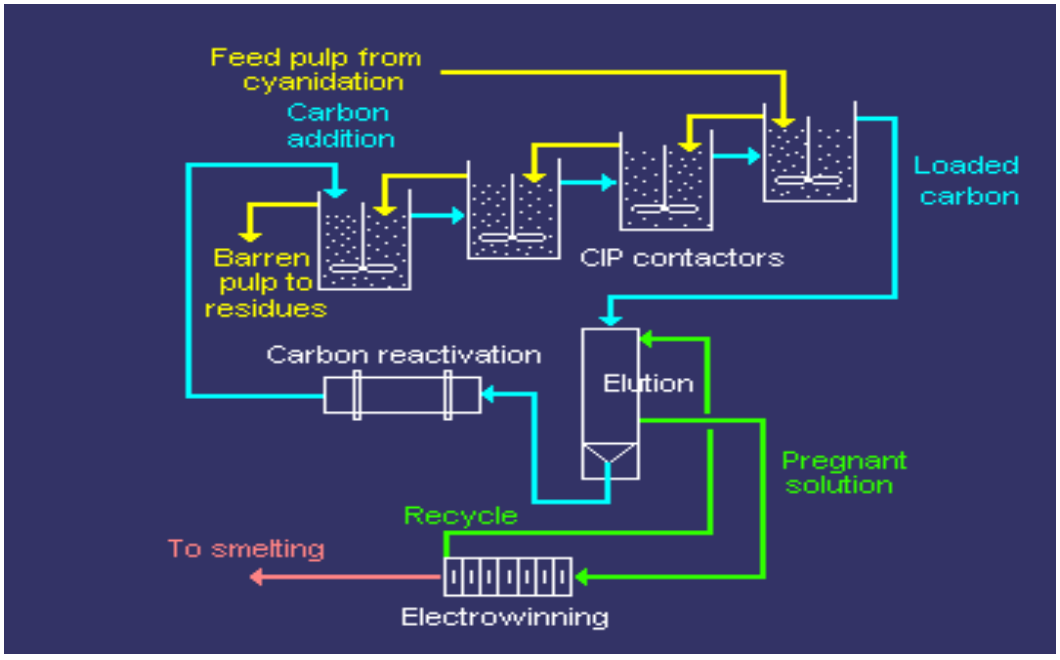
The project plans to use Carbon-In-Pulp (CIP) gold processing technology. Carbon in Pulp (CIP) is an extraction technique for recovery of gold which has been liberated into a cyanide solution as part of the gold cyanidation process. Introduced in the early 1980s, Carbon in Pulp is regarded as a simple and cheap process. The gold cyanide complex is adsorbed onto the carbon until it comes to an equilibrium with the gold in solution. Because the carbon particles are much larger than the ore particles, the coarse carbon can then be separated from the slurry by screening using a wire mesh.

Modern gold-recovery techniques depend on the fact that gold (and silver) dissolves in dilute solutions of cyanide. The broken ore from the mine (or tailings for this particular project) is first ground to a fine powder in large rotary mills, and the slurry of fine ore and water (the 'pulp') is treated with cyanide in large tanks that are stirred mechanically or by air-agitation. In the conventional process, the gold that is dissolved (leached) into the solution is precipitated by adding zinc dust. However, before this can be done, the pregnant gold-bearing

solution must be filtered to remove the fine particulate matter, then rendered sparkling clear. De-aeration may also be required. After the zinc dust is added, the solution has to be filtered again to remove the zinc-gold precipitate.

The carbon-in-pulp (CIP) process, which was developed to its present form in South Africa during the 1970s, is considered to be the most significant advance in gold recovery technology in recent years. Using CIP, the minute (but economically important) quantity of gold that remained in the barren solutions and solid residues from conventional processing can be recovered. Although the amount of gold extracted is high, the equipment is expensive and complicated to maintain and operate

In the CIP process, activated carbon is used to adsorb the gold directly from the cyanided pulp in a series of large adsorption tanks. Activated carbon acts like a sponge to aurocyanide and other complex ions in solution. Hard carbon particles (much larger than the ore particle sizes) can be mixed with the ore and cyanide solution mixture. Pulp flows continually from the first vessel to the last in the series, and the carbon is transferred intermittently by pumping in the opposite (counter current flow) direction between a series of tanks. Interstage screens between the tanks prevent the carbon from moving downstream. The gold value of the pulp decreases downstream, and the gold loading on the carbon increases upstream, with the highest value in the first tank.



Gold is washed (eluted) from the loaded carbon with a solution of cyanide and caustic soda, and then recovered by electrolysis or by precipitation with zinc dust. This method makes it unnecessary to filter the pulp and subsequently treat large volumes of dilute gold-bearing solution.

4.1.5.3 The Leaching Plant Process

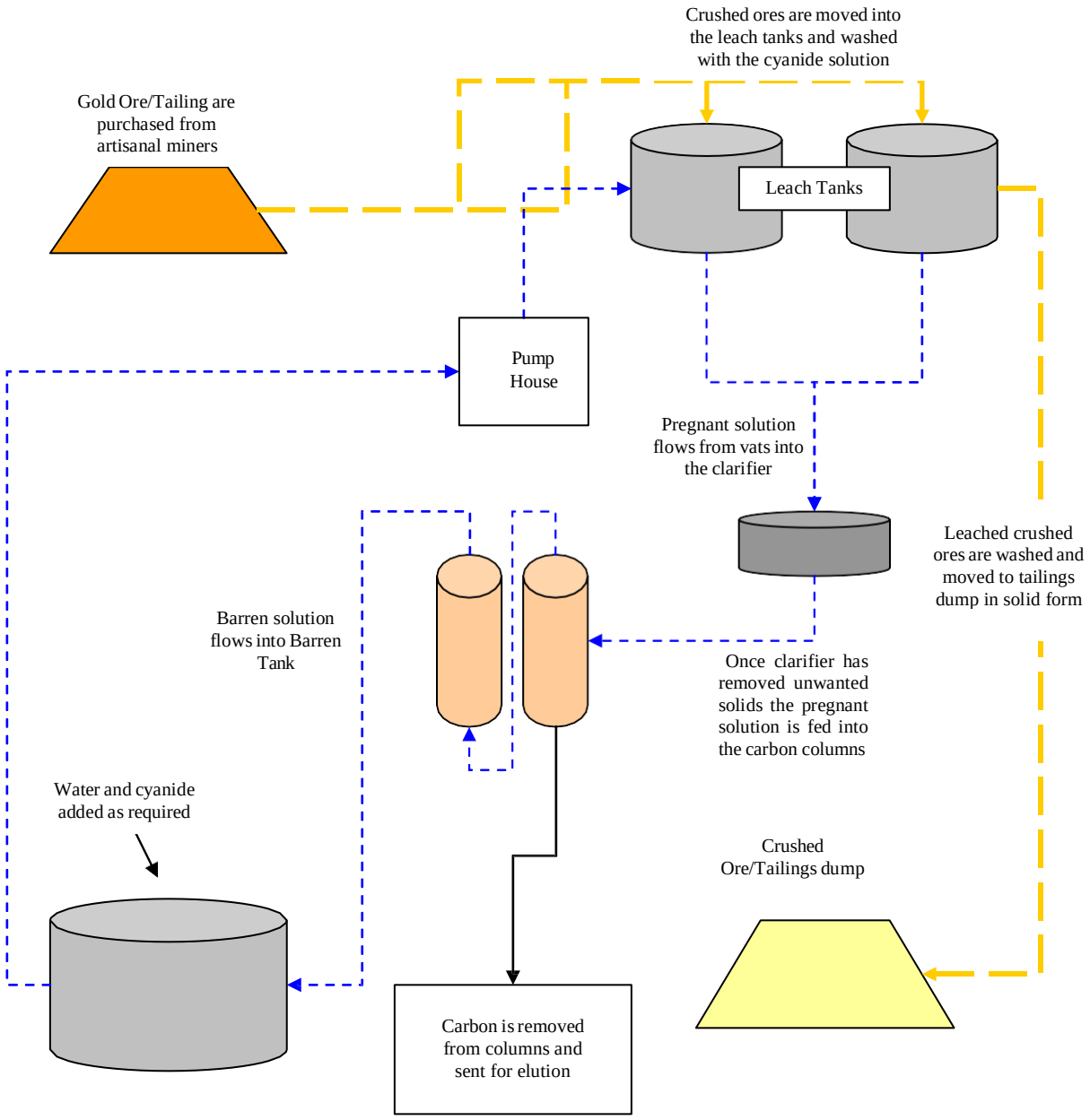
The crushed gold ore is brought to the plant in trucks and offloaded adjacent to the leaching plant. The leach steel tanks will have a capacity of approximately 20 tons. The ores are ground into fine powder in the ball mill plant before being mixed with hydrated lime and placed into the leaching tanks. The hydrated lime optimises the conditions for gold extraction and reduces the loss of cyanide by hydrolysis. The tap at the bottom of the tank is closed and a cyanide solution of approximately 250ppm is run into the top of the tank at a slow rate so as to achieve a plug flow through the tank and avoid channelling. This improves gold extraction. Once the tailings have been soaked, the tap is opened and solution is allowed to percolate through the fine powder of tailings, dissolving the gold in its path. The solution flows through a filter at the base of the tank that keeps the tailings in the tank.

The gold bearing (pregnant) solution flows out of the tank and into the clarifier. This removes any unwanted solid particles in the clear solution. This solution is then pumped through a series of carbon columns or contactors. The carbon adsorbs the gold from the pregnant solution. Barren solution then flows out of the columns and into the barren tank. Water and cyanide are added here to maintain the balance in the closed system. Oxygen, a key reactant in the process is added in the barren tank by using a pump to aerate the solution. The barren solution containing the cyanide is then pumped into the newly filled tank and the solution cycle starts again.

After 3-5 days of solution flowing through the tailings the gold will have been extracted. The exhausted ores in the tank are now washed with water and drained. The tank is then emptied and the gold ores are moved to the slurry storage pond.

Once the gold has been absorbed by the carbon, the carbon is removed and replaced with fresh carbon. The loaded carbon is then sent to the elution plant for extraction/stripping.

4.1.5.4 Leach Plant Schematics



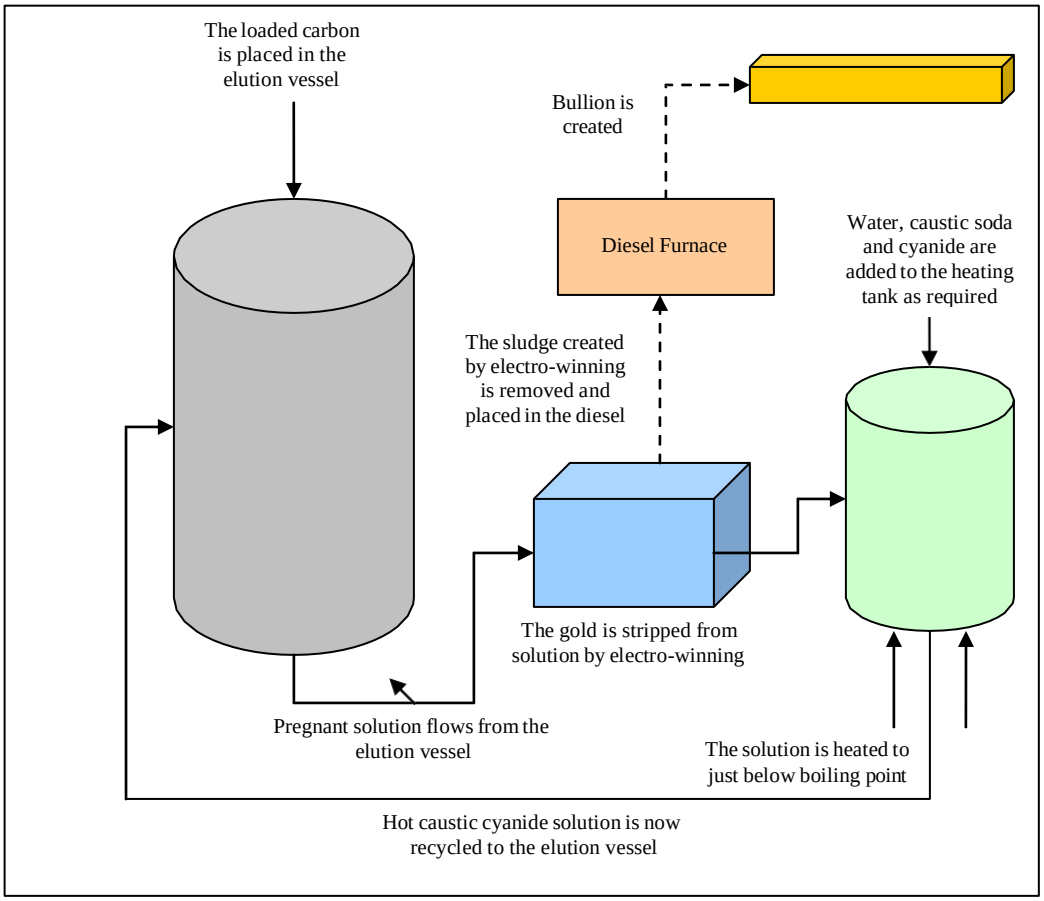
4.1.5.5 Elution, Extraction and Smelting

Once the loaded carbon has been transported from the leach plant to the elution plant the stripping of the gold can commence. This is done by taking the carbon

and placing it in an elution vessel. Here the process of loading the gold onto the carbon is reversed and the gold is stripped. This is done by passing hot caustic solution past the carbon. Once the gold has entered the solution, it is pumped to an electro-winning cell. Here the gold is removed using electrolysis and it accumulates at the steel cathode. The now barren solution is then pumped to a heating tank where more cyanide and caustic soda can be added to recharge the stripping solution. The solution is now fed back to the elution vessel for another stripping cycle.

Once all the gold has been stripped from the carbon, the carbon is removed and replaced with more loaded carbon. The stripped carbon is then acid washed and sent back to the leach plant for reloading. The gold sludge is now removed from the electro-winning cell, placed into a kiln and smelted to create bullion.

4.1.5.6 Elution Plant Schematics



4.2 Raw Materials Requirements and Availability

Neerika Holding and General Supply Limited will be operating a gold processing plant using crushed gold ore to be obtained from own mining site as the source of raw materials. Processing chemicals required for the process are sodium cyanide, lime, silver nitrate, carbons, potassium iodide, POP, chloride exide and hydrochloric acid.

At the processing rate of 180 metric tons per week in year one, 195 metric tons in year two and 210 metric tons per week from year three onwards, the facility will require 8,640 metric tons of gold ore/tailings per annum in the first year of production, 9,360 tons in the second year and 10,080 metric tons from year three onwards.

Chemicals Requirements per annum

TYPE OF CHEMICAL	YEAR 1	YEAR 2	YEAR 3 ONWARDS
Sodium Cyanide (6,000 kgs)	7,200 kgs	7,800 kgs	8,400 kgs
Lime (54,000 kgs)	64,800	69,840	75,600kgs
Silver Nitrate (6 litres)	7.2 litres	7.8 litres	8.4 litres
Carbons (12,000 kgs)	14,400	15,600	16,800
Potassium Iodide (3 litres)	3.6 litres	3.9 litres	4.2 litres
POP	7.2 litres	7.8 litres	8.4 litres
Chloride Exide	14.4 litres	15.6 litres	16.8 litres
Hydrochloric Acid	216 litres	234 litres	252 litres

These chemicals will be originated from China,

4.3 Production Costs and Revenue Estimates Direct Costs

The major costs under this project are:

Raw Materials (Gold Ore/Tailings): is estimated to cost US$ 37 per metric ton. This involves digging the ore (US$ 12 per ton), loading (US$ 7) and transportation from mining pit to processing site (US$ 20 per ton). At the rate of 10,080- per annum at full production, the main raw material is expected to cost 372,960 per year – which translates to about 25% of sales revenue;

Gold Ore Crushing Costs: this involves the cost of running the crusher. The crusher is estimated to consume 30 litres of fuel and oils per three-shift day, 6 days a week. At the current price of diesel and oils, this translates to the cost of US$ 30 per day @ US$ 1 x 6 days per week x 4 weeks x 12 months = US$ 8,640 plus 10% thereof being cost of oils total US$ 9,504;

Processing Costs: the cost of running the processing plants are simply application of chemicals in the leaching tanks. The major chemicals are: sodium cyanide, lime, silver nitrate, carbons, potassium iodide, POP, chloride exide and hydrochloric acid.. This is estimated to cost 12% of gross revenue, i.e. US$ 145,152- in year one, 157,248- in year two, and US$ 169,344- from year three onwards;

Elution Costs: the activated carbons will be processed in private elution plants. The charges payable to the elution plant owners for the service are estimated at 8% of gross revenue. Hence, year one US$ 96,768-, year two US$ 104,832- and US$ 112,896- from year three onwards.

Repair and Maintenance: It is projected to cost 5% of the cost of all major assets per annum. These include plant machinery & equipment (US$ 519,000-) and utility motor vehicles (US$ 125,000-) totaling US$ 634,000- x 5% thereof = US$ 31,700-;

Labour Cost: The project plans to recruit and employ regular employees (26) including crusher operators, processing plant operators, Plant Technicians and Security Guards on permanent and pensionable terms. In addition to the Managing Director, the project will hire three line managers, i.e. Technical Manager, Production Manager and Finance & Administrative Manager. It will also employ about 18 General Workers.

Labour cost is estimated at 9.6% of gross sales revenue, hence a budget of US$ 116,120- has been set aside for salaries, wages and labour overhead costs (including social security and medical insurance) in the first year of operation, US$ 126,277- in the second and US$ 135,475- from year three onwards.

Fuels & Oils: Will be required in running power generators, mining equipment and motor vehicles. It is estimated that 18,000 litres will be required per annum which is computed at US$ 18,000- per year.

Revenue Estimates

Gold processing is projected at 8,640 tons per annum in the first year, 9,360 tons in the second and 10,080 tons from year three onwards.. From tests conducted at materials from the sites and experience from almost one year of operation, gold production is estimated at an average of 4 grams per ton of ore/tailings at the recovery rate of 75% to 80% using cyanide leaching process. Revenue per gram is estimated at US$ 35.00 before deducting royalty of 5%. At this rate therefore, revenue is computed as per table below:

YEAR	PROCESSED RAW MATERIALS (TONS)	GOLD RECOVERY PER TON (GRAMS)	PRICE PER GRAM (US$)	ESTIMATED REVENUE (US$)
1	8,640	4	88	3,041,280
2	9,360	4	88	3,294,720
3 onwards	10,080	4	88	3,548,160

4.4 Environmental Aspects Emission Controls

Neerika holding and general Supply Limited operations will have a minimal impact on the environment of the area. A benefit of using vat leaching as a method of gold extraction is that the crushed gold ore/tailings can be washed and drained before moving to the dump site. This means that the tailings/crushed and extracted ore will be inert and relatively free of chemicals. The last charge to the vats will be a fresh water wash. This will ensure that all salts, soluble material and cyanide are washed from the crushed and extracted gold ore rendering the ore chemically inert. A good quantity of Ferro-Sulphate will be stored at site. Should any cyanide spillages occur, this can be used to neutralise the chemical safely Expansion of the company into chemical retailing will also help artisanal/small scale miners to obtain the chemicals required in gold processing at a lower cost, given the current chemical costs which are prohibitive.

Wastes and by-products

As for waste and by products, the main types of wastes are solid waste and liquid waste. Solid wastes that are currently generated during production include pieces of paper resulting from office use, plastic drums from chemicals

used, and used tailings. Yard wastes are handled through existing waste collection point within the facility of which are burnt, while empty plastic drums are kept for destruction within the designated area.

Waste water generated including grey and black water (kitchen and toilets respectively) are temporarily stored in septic tanks on-site of which, when full, will be collected by septic emptier to municipal waste water stabilization pond for final disposal. Waste waters generated from the different stages of processes are collected within a separate reservoir outside the facility fence. The amount of waste water generated at Neerika Limited is approximately 80 cubic metres per month from washrooms, kitchen and processing. The company has installed a number of septic tanks used for temporary storage of the effluents section wise before being taken to municipal waste water stabilization ponds when are full.

4.5 Implementation Schedule

Neerika Holdings and General Supply Limited plans to import mining equipment and develop processing capacity to meet the project goals. The company plans to bring in the plants soon after being granted TIC accreditation. Assuming that all things run according to plan, the company should start mining operations by 15th of January 2025 at the latest.

5.0 RELEVANT POLICY AND LEGAL FRAMEWORK FOR PLANT OPERATIONS

5.1 Overview

This chapter concerned with the way the plant is required to comply with policy and legal Framework within the country and therefore to enforce the compliance of Neerika Holdings and General Supply Company Limited plant to the policy and legal frame work.

5.2 Policy frame work

Tanzania Environmental policy applicable to the established and operated plant include:-

5.2.1 National Environmental Policy (1997)

The national Environmental policy addresses the broad spectrum of environmental concern. The policy requires that industrial development be done in a way that it does not compromise the environmental integrity. It stipulated that the chosen technologies should be environmentally friendly, socially acceptable and economically viable. The policy states that in order to protect the environment and to ensure sustainable development, the following objectives shall be pursued;

I. Environmental audits / inventory shall be carried out for the existing industries for pollution control and waste minimization;
II. Industries should be planned in manner that minimized adverse effect on the environmental at all stages (i.e location, effluent discharge, waste disposal, use and disposal of products);
III. Industrial emissions shall be controlled;
IV. Workers health shall be adequately protected from environmental health hazards.

The policy underscores the importance of conserving environment, protecting public health and promotion of national industrial base.

During the operation Neerika Holdings and General Supply Limited plant shall observe the requirements of this policy's objective.

5.2.2 National Health policy (1990)

The health policy aimed improving health status of all people wherever they are, by reducing morbidity and mortality and raising life Expectancy. Good health, i.e physical mental social wellbeing, is a major resource of economic development. Neerika Holding and General Supply Limited plant shall observe this legal requirement by ensuring all their workers are in healthy ensured.

5.2.3 National Water policy(2002)

The planning, sitting designing, construction strategy and operations of the project are also in consistence with the national water policy (2002), which provides for a comprehensive sustainable and equitable exploitation and use of water resources for sustainable development. The policy seeks to ensure more efficient utilization of existing water resources and improved monitoring to control water quality and arrest contamination from industrial sewerage and excessive use of chemicals. These objectives requite an integrated and holistic planning and management approach in areas of water use and disposal of effluents.

During the operation of Neerika Holding and General Supply Limited plant shall observe the requirements of this policy's objectives.

5.2.4 National Human Settlement Development Policy (2000)

The planning of the proposed project is in harmony with this policy. Among others, one of the objectives of National Human Settlement Development policy (2000) is to protect human settlement, the environment and its embedded ecosystem from environmental pollution, environmental degradation and destruction or loss of biodiversity in order to attain sustainable development. During the operation of Arab Neerika Holding and General Supply Limited plant shall observe the requirements of this policy's objectives.

5.2.5 The National Land Policy of 1995

The National land policy advocates the protection of land resources from degradation for sustainable development. Among other things the policy requires that the project development should take due consideration the land capacity, ensure proper management of the land to prevent erosion, contamination and other forms of degradation. Important sections of policy relevant to the developer are 2.4 (on use Of land to promote social economic

development), section 2,.8 (on protection of land resources) and section4 (on land tenure). During the operation of Neerika Holding and General Supply Limited plant shall observe the requirements of this policy's objectives.

5.3 Legal Framework

Tanzania Environmental Regulations applicable to the established and operated plant include;

5.3.1 Environment Management Act (Cap 191 of 2004)

The Act provides a legal and institutional framework for the sustainable management of the environment. It outlines the principles for management, impact and risk assessments, the prevention and control of pollution, waste management, environmental quality standards, public participation compliance and enforcement. It provides the basis for the implementation of international instruments on the environment and the National Environment policy. All project actives must be planned in order to comply with the provisions of part VI (EIA) – review process of environment impact statement) studies, part x (environmental audit). During the operation of Neerika Holding and General Supply Limited plant shall observe the requirements of the Act.

5.3.2 Land use planning Act (no; 6 of 2007)

The national land use commission (NLUPC) was established as the principal advisory organ of the government on all matters related to land use. Among other functions, it recommends measures to ensure that Government policies, including those for development and conservation of land are in harmony. It also takes adequate account of their effects on land use and seeks the advancement of scientific knowledge of changes in land use. It encourages development of technology to prevent, or minimize adverse effects that endanger man's health and his/ her welfare; it also specifies standards, norms and criteria for beneficial uses and maintenance of the quality of land. During the operation of Neerika Holding and General Supply Limited plant shall observe the requirements of the Act

5.3.3 Land Act (no. 4 of 1999)

According to this Act all land in Tanzania continues to be public property and remain vested in the president's as custodian for citizens of Tanzania. The proponent of the established plant acquired the land for the project site based on

this legal provision. Hence, during the operation of Neerika Holding and General Supply Limited plant shall observe the requirements of the Act.

5.3.4 Occupational Health and safety Act (no. 5 of 2003)

This Act makes provisions for safety; health and welfare of person at work in factories and all other places of work. Also provides for protection of persons other than persons at work against hazards to health and safety arising out of or in connection with activities of persons at work. Relevant section of the ordinance to the project activities include part IV section 43(1) – safe means of access and safe working place, prevention of fire; and part V on health and welfare provisions which include provision of supply of clean and safe water to workers, sanitary convenience, washing facilities and first aid facility. Section 50 deals with fire protection issue. During the operation of Neerika Holding and General Supply Limited plant shall observe the requirement of the Act.

5.3.5 Workmen's compensation Act (no. 20 of 2008)

This arrangement provides for under section 19 (1) of Act 20 of 2008. In respect of the "FUND" this shall depend on such approved rates based on the total wage bill, to be contributed by employers. Compensation shall only be paid to diseased dependants or injured workmen whose employers have been registered as "contributing employee' to the Fund. This arrangement reads as follows:

Where an employee has an accident resulting in the employee's disabling or death the employee or dependants of the employee shall, subject to the provisions in this Act, be entitled to the compensation provided under this Act, During the operation of Neerika Holding and General Supply Limited plant

5.3.6 Employment and labour Relation Act (no. 6 of 2004)

This Act guarantees labour right and establishes basic employment standards. The Act provides broad protection against discrimination. Specifically, the Act mandates that employers "promote equal opportunity in employment and strive to eliminate discrimination in any employment policy or practice". It prohibits direct or indirect discrimination by employers, trade unions and employers' association on a number of grounds, including gender, pregnancy, marital status or family responsibility, disability, HIV/ AIDS and age. Harassment of an employee on any of these grounds is equally prohibited. The Act also requires employers to take "positive steps" to guarantee women and men the right to safe

and healthy environment. During the operation of Neerika Holding and General Supply Limited plant shall observe the requirements of the Act.

5.3.7 The water resource management Act no 11 of 2009

PART (VI) deals with protection of water resources under the section 39 of prevention of pollution states that; "an owner or occupier of land which any activity or process is or was performed or under taken, or any other situation exists which causes has occurred or is likely to cause pollution of a water source, shall take all reasonable measure to prevent any such pollution from occurring, containing or recurring. During the operation of Neerika Holding and General Supply Limited plant shall observe the requirements of the Act.

5.3.8 The Standard Act no 2 of 2009

Tanzania Bureau of standards (TBS) is Tanzania's sole standard body established by parliament Act No. 3 of 1975 and subsequently amended by Act no. 1 of 1977. TBS is a parastatal organization under the ministry industry, Trade and marketing. The standard Act. 3 of 1975 was further repealed by Act no 2 of 2009 According to the enabling Act the broad mission of TBS is to promote standardization and quality assurance in industry and commerce. The specific tasks enumerated in the Act are geared towards fulfilling the stated mission. During the operation Neerika Holding and General Supply Limited plant shall observe requirements of the Act.

5.3.9 The industrial and consumer chemicals (management and control) Act, 2003

The objective of this act is to ensure management and control of the production, importation, transportation, exportation, storage, dealing, and disposal of chemicals and for matters connected therewith. The act promote good manufacturing practices, require risk assessment and risk management and emergency response plan. It gives definition of toxic chemicals and their dosage and registers and certifies chemicals before use. Section 11 requires chemical registration to the chief Government chemist in the prescribed manner and form, as set out in the second schedule to this Act. Neerika Holding and General Supply Limited plant shall observe this legal requirement.

6.0 REQUIRED STANDARDS FOR INDUSTIAL OPERATION

6.1 Overview

This chapter explains on how the plants shall practice their activities in such a way that not causing pollution to the environment from emissions, discharges and sounds produced during the operation in relation to the adoption of relevant standards.

6.2 The relevant standard

Different standards are being used depending upon different parameters of concerns. These include the waste water standards discharge, permissible noise levels and air pollution standards.

6.2.1 Noise levels standards

The permissible noise level standards for the workers from plant are categories into different limits according to during to duration (daily) hours). According to **Tanzania Bureau of standards (TBS)** the recommended value for 8 hours for the workers in a plant is 85DBA.

6.2.2 Indoor Air Quality Standards

Indoor pollution sources that release gases or particles into the air are the primary cause of indoor air quality problems in factories. Inadequate ventilation can increase indoor pollutant levels by not bringing in enough outdoor air to dilute emissions from indoor pollutant levels and by not carrying indoor air pollutants out of the factories. High temperature and humidity levels can also increase concentrations of some pollutants. The source of indoor air pollution in any plant include combustion source such as oil and gas. These range in size from 0.3 to 100 microns, and are small enough to be inhaled, but too large to be easily exhaled. Smoke from biomass combustion produces a large number of health damaging air pollutant such as reparable particulate matter carbon monoxide (CO), nitrogen oxides formaldehyde, benzene, poly-cyclic aromatic hydrocarbons and many other toxic organic compounds.

6.3 Adoption of standard

For Ensuring not causing the pollution to the environment from its emissions, discharges and sounds produced during the plant operations relevant standards are practiced in such a way that;

- The workers shall be provided with the nose mask at the machines/ working places were dust are being emitted so as to protect workers from the health effects due to dust emission , also there shall be enforcement of the workers to wear the nose mask.
- Noises generated during operation machinery equipment which produces reasonable sound during operation.
- There shall be proper emergency prevention and preparedness, no smoking sign for fire prevention shall be provided; the workers shall be trained in risk of fire hazards and within the plant shall be reasonable number of fire extinguishers.
- Solid waste generation, management and disposal shall be well managed within the plant and stored in the required storage facilities ready for collection to the final disposal.

7.0 ENVIRONMENTAL MANAGEMENT

The following sections describe the environmental protection commitments, control strategies and performance objectives for the operation of the Neerika Holding and General Supply Limited plant. Each section provides and outline of the environmental values and potential impacts associated with the project and how these will be controlled.

7.1 Air

Description of Environmental values

The air Quality environmental values to be enhanced or protected are:

- Human health and wellbeing and
- The aesthetic of the environment, including the appearance of buildings structures and other property.

Potential Adverse or Beneficial impacts

Key Neerika Holding and General Supply Limited plant components that emit air pollutants include:

Vehicular movement

Other activities due to the operation of the plant occur intermittently for a short duration and are Mobile or are transient in nature. These activities are likely to be intermittent sources of air pollutants. Emission sources in this category include:

- Variable emissions from normal operating equipment during start up and shut down.

Point source Air Emissions: Generator usage while in action

Environmental protection commitments: Neerika Holding and General Supply Limited plants commits that it will:

- Ensure emissions of air pollutants (including odour, dust and light) to the atmosphere are minimized and air quality objectives are met during operation.
- The objectives, standards and control strategies to be employed during operation have been identified and will strictly be adhered to.

Environmental Protection Commitments: Neerika Holding and General Supply Limited plant commits that it will develop and implement procedures and monitoring program to identify, investigate and conduct necessary remediation for potential site contamination.

7.2 Noise

Description of Environmental Values:

The environmental values to be enhanced or protected for noise are:

- Human health and wellbeing, including by ensuring a suitable acoustic environmental for workers involved in the plant's operation activities. The workers for the plant are the sensitive receptors.

Potential Adverse or Beneficial Impacts

The plant operate at 100% capacity, 24 hours per day with shift system. The measured noise levels pf below 85DBA at all receivers around the plant comply with the criteria noise levels.

Environmental Protection Commitments

To manage potential impacts of noise during operation, Neerika Holding and General Supply Limited plant will develop and implement noise management plan that addresses potential impacts including the schedule of high noise activities during normal working hours, where practicable.

7.3 Health , safety and environment Description of environmental values:

The environmental values to be protected and enhanced are life, health and wellbeing of people. Potential impacts on health and safety associated with the operation of the plant are:

- Contamination of ground and surface water or land
- Destruction / impairment of the plant
- Exposure of plant personnel or the community to harmful substances
- Injury or death to members of the community from unauthorized access to the plant site
- Workers training contributes beneficially to community health and well being.

Environmental protection Commitments: Neerika Holding and General Supply Limited will:

- Continuing hazard and risk studies through the plant life

- Communicate plant health and safety practice results of relevant monitoring through consultation sessions and meetings.
- Developing a safety report to cover major hazard facility requirements during operations
- Routine health checkups for the plant operators

7.4 Waste

Activities: The types of waste generated from the plant's operating activities include:

- Atmospheric emissions
- Wastewater discharges
- General and regulated solid and semi- solid waste.

The following sub- sections provide information about the waste streams, as well as associated management options to minimize disposal of wastes and potential environmental or human harm.

Atmospheric Emissions

Wastes associated with plant's processing are primarily generated as atmospheric emissions, primarily from the mixing of raw materials and clutching. During normal operation, the majority of these are produced from the following stationary sources:

- Generator and smelting operations

Non- routine operations are those outside of the general operating parameter for the facility, which occur intermittent. For a short duration. Emissions from these events are variable and intermittent.

These emission sources include vvariable emissions (start up and shut down).

Wastewater Discharges

The plant operations generate the following wastewater disposal streams:

- Storm water from the plant site
- Sewage effluent
- Potentially contaminated wastewater from the facilities process areas:

Solid and semisolid wastes

The solid and semi- and semi- solid wastes generated through the operation of the plant are:

- General wastes including domestic waste garbage and recyclables from onsite workers, office wastes, paper and cardboard, as well as box / bags from packaging.
- Medical and first aid station waste.
- Regulated waste and / or hazardous wastes including waste lubricating oils and sewage.

Waste materials generated during the plant operation that be re- used on- site are collected in mobile garbage units and water management facility.

Potential Adverse or beneficial impacts

Environmental impacts from waste occur as a result of poor management. The potential impacts include the following:

- Land and water contamination from inappropriate storage, handling and disposal of solid and liquid waste.
- Land and water contamination from spills and releases during handling and transportation.
- Odors due to inappropriate storage and handling of waste.
- Water contamination from discharges of contaminated storm water, sewage effluent.
- Inefficient use of resources.

Environmental protection commitments

Neerika Holding and General Supply Limited Mines plant commits to the following waste management and minimization actions:

- Implement a waste management plan consistent with the Environmental management Act, 2004 for the plant to reduce the risk of contamination of land or water.
- Ensure removal, transport and disposal of all general waste and regulated wastes by an appropriately licensed waste management contractor and facilities.
-

7.5 Water

Potential Adverse or Beneficial Impacts

The potential impacts on water have been divided into four categories:

- Water supply
- Storm water
- Surface water
- Wastewater.

In addition, water supply requirements have the potential to generate impacts through extraction to address water supply requirements during operations. Each of these issue and the impacts identified are addressed below:

(1) Water supply

The estimated water demand for the plant for daily operational activities is 5m3 daily for both domestic and industrial activities.

(2) Storm

Storm water runoff has the potential to generate the following impacts:

- Increase runoff scouring sediment from site causing increase sedimentation in water courses
- Uncontrolled release of contaminants and volumes of waters of variable quality resulting in short or long- term environmental impacts, personal injury

(3) Surface water

The plant is utilizing the surface water (tap) as a source of supply for the plant during operations. Therefore, the plant is expected to have an impact on surface water quality or quantity under normal operating circumstances. Accidental spills or leaks have the potential to seep to surface water. Appropriate control strategies will be implemented to minimize or avoid the anticipated pollution.

(4) Wastewater

The plant operations generate the following wastewater disposal streams:

- Sewage effluent.
- Potentially contaminated wastewater from the plant process areas.

All processed wastewater from the plans are managed and discharged in accordance with discharge criteria established in the relevant

environmental permits sewage effluent will be disposed to sewage system existing in the area.

The potential impacts associated with these discharges include:

- Degradation of the aquatic habitat and surface water contamination spills
- Increased volumes of contaminated storm water.
- Land and water (surface water and groundwater) contamination from inappropriate storage, handling and disposal of solid and liquid wastes.

Environmental protection commitments

Neerika Holding and General Supply Limited Mines plants will pprepare a storm water management plan to ensure that the quality of storm water discharged from the plant is monitored

7.5 Environmental Monitoring Program

Environmental monitoring requirements have been identified. They will be undertaken during the operation of the plants. These monitoring requirements will be updated as required to reflect approval conditions. In addition the monitoring requirements identified here will be an ongoing review in accordance with the following:

- Annual basis
- Incident or emergency
- Identification of noncompliance with environmental authority conditions
- Legislative changes (including standards and guidelines)
- New or changed in process (including addition or removal of mitigation measures)
- When further risk studies are undertaken

The Neerika Holding and General Supply Limited plant environmental manager to provide semi-and annual reports to the plant general manager on routine monitoring and auditing activities and results

7.7 Summary and Recommendations over Environmental Protection Issues

From the study conducted it can be concluded that; the current environmental management system is well managed in terms of sound level, air quality, wastewater discharge, proper raw materials management, staff awareness, water management and economy of use and solid waste generation. To ensure the proper environmental management of the plant, the following recommendations should be adhered to:

- Within Neerika Holding and General Supply Limited Mines plant there should be a proper raw materials management, staff awareness, participation and training in environmental issues, water management and economy of use, solid waste generation, management and disposal and environmental emergency prevention and preparedness.
- Wastewater generated from the plant.
- Air quality shall be managed in such a way that the emitted gases/ particulate matters should be within the permissible range.
- The plant management shall provide protective gears to the workers; enforcement on the use shall be done.
- The Neerika Holding and General Supply Limited plant shall employ the environmental officer/ manager responsible for the plant's environmental issues.
- There should be regular maintenance and repair of plant's equipment to maintain their functionality.

8.0 ORGANISATION AND MANAGEMENT

8.1 Board of Directors

The project will be managed through the Board of Directors. The Board will formulate policy, offer strategic business guidance to management and regularly monitor and evaluate performance of the company. The Board of Directors will comprise of the company directors and possibly a representative from the lending institution in this project. Only the shareholders will have the right to vote.

8.2 Management and Organizational Structure

The day to day management of the company will be vested in the management team to be headed by a Managing Director. The Managing Director will be directly assisted by three line managers who will further be assisted by four Managers responsible for the plant, workshop, purchasing and administration. These will in turn be assisted by qualified and experienced personnel.

There will be three line managers:

- The Logistics and Procurement Manager who will be in-charge of procurement, and transportation activities, including raw materials
- Production Manager who will be in-charge of plant operations and production while the
- Finance and Administration Manager will look after all financial matters including personnel and up keep of proper records of company accounts and assets.

Below the three line managers, there will be four supervisors to assist the line managers. They will be responsible for the plant, workshop, purchasing and administration. These will in turn be assisted by qualified and experienced personnel.

On implementation of the proposed project, the company plans to employ up to 44 people in the next three years.

at the end of economic life of the project. This is a positive indication that the project is liquid enough to meet its cash requirements to support its trading operations.

The company net-worth increases from US$ 540,892- at the end of construction period to US$ 1,090,728- by end of the 10th year, a significant growth in the value and profitability of the company.

9.0 Appendix III - Discounted Cash flow

The Discounted Cash flow yields an Internal Rate of Return (IRR) of 22.20%, which is well above the assumed cost of capital at 8%. This confirms the financial viability of the proposed project. NPV Ratio is positive at 0.65.

Key Financial Ratios

- Debt Service Coverage Ratio- ranges between 1.43 and 2.86. This is well above 1.0, another indicator that the project will comfortably service interest and principal repayments as and when they fall due.

- Return on Investment (ROI) is 24.29% during the first year. It increases over the years as the loan liability is reduced

Payback Period

The entire investment of US$ 917,000- is estimated to be recovered in about 5 years at zero discount rate, and 6 years when discounted at the cost of capital at 8%. This is a clear demonstration that the project has a reasonable return of return on investment.

Appendix VI - Breakeven Analysis

Highest breakeven capacity is estimated at 65.95% during the first year of operation and the lowest breakeven capacity is 2.97% during the 10th.

The management will strive to achieve higher capacity than the breakeven point at 84.15% and 57.22%.

Sensitivity Analysis

From the analysis carried out on changes of some key factors to show their effect on profitability and IRR, the project shows to be more sensitive to changes in selling price than changes in decline in capacity utilisation and increase in direct production costs.

10.0 THREATS TO PROFITABILITY AND RUNNING OF THE PROJECT

Risk analysis can be looked from the strengths and weaknesses of the project as follows:

10.1 Refractory Ores

It will always be the case that there are some gold ores that are more amenable to the leaching process than others. Ore bodies can have certain characteristics that make gold extraction difficult. This can be due to sulphides ores that consume reagents, carbonaceous ores that reabsorb the gold once it is liberated or telluride ores that dissolve poorly in cyanide solutions. Although such ores have been yet to be found following the initial study, if they are found, Neerika Holding and General Supply Limited will not treat them as the preparation of such ores for leaching will be prohibitively expensive and complicated. All such refectory ores will be identified during sampling. In the case of sulphide ores it is usually possible to identify the crushed ore by its appearance and odour.

10.2 Copper Rich Ores

Another problem that similar operations have experienced has been high concentrations of copper in the gold ores. This copper has the effect of displacing the gold in the extraction process, thereby reducing gold produced. All copper levels in the samples taken have been well below acceptable levels. Ores that are high in copper can still be treated, but it must be ensured that only a small proportion of the vats should contain such an ore to keep the copper concentrations below a certain threshold. The copper content of all the tailings will be measured during sampling.

10.3 Gold Price

The price of gold can be very volatile. With current gold prices the prediction is for a very profitable company but if the gold price recedes to the kind of levels seen 10 years ago, such operations will struggle to remain profitable.

10.4 Political and Social Instability

Like all other gold mining sites in the country, the proposed location in Nyarugusu District, Geita Region for the processing activities are likely to experience civil unrest as the people surrounding the areas feel that the mining lands are their properties which have been confiscated by the government and given to foreign miners. After independence the government made an attempt to unify the country and reduce the negative aspects of tribalism in Tanzania.

package to the local miners that were displaced during setup. The levels of civil unrest in the area where Neerika Holding and General Supply Limited plans to set up its leaching operations are thought to be significantly less risky. However, it is hoped that as the plants presence in the area will significantly benefit the local miners and population and will not harm any local interests, the company will be popular and will experience little strife.

10.5 Security

There are certain traits of Neerika Holding and General Supply Limited that make security issues much less significant than with most other gold producing companies..

There will be two layers of security for the leach plant. There will be an outer perimeter that encompasses the entire plant and an inner secure compound where all valuable items will be stored. Both will have their own security.

A basic level of security will be maintained at the elution plant. On days when gold is being produced, extra security will be arranged. The gold produced will be taken to safety immediately and sold or stored. Neerika Holding and General Supply Limited will not store gold in own premises or speculate on gold price.

11.0 DEVELOPMENT VALUES/BENEFITS

Implementation of this project will lead to realisation of the following development values/economic benefits.
In the region of 44 jobs will be created directly in the proposed mining and processing facilities.
The operations will significantly add value to current artisanal miners by replacing artisanal mining techniques to modern techniques as part of technical support to the miners.
A high proportion of the investment will be spread widely to remote communities that are in desperate need of jobs and investment.
The village in which the mining operations will be taking place will also see a number of benefits besides the creation of jobs. When boreholes are sunk on site to allow extraction of water for the process, boreholes will also be provided for the village, improving their access to fresh water. It will also be useful for the plant to be connected to mains electricity.
The Tanzanian government has been striving to rationalise and organise the artisanal mining sector. Companies like Neerika Holding and General Supply Limited can play a key role in such a process. Although the company will not get directly involved with the artisanal mining activities, it will be in the interests of the company to assist current miners with this process to ensure a good supply of gold ore and tailings which in turn may also sell gold extracted to Neerika Holding and General Supply Limited.
For this reason if the company is forward thinking it will try and work with the artisanal miners and find ways of significantly increasing gold ore and tailings production. This shared interest will play a key role in improving technologies and processes used by the artisanal sector.
The project involves transfer of technology to Tanzania. Tanzanians will be trained on the job on how to extract gold using modern gold processing techniques.

12.0 CONCLUSION AND RECOMMENDATIONS

Analysis of the project confirms that the project is:

- Technically feasible,
- Financially and Economically viable,
- Socially desirable
- Environmentally sound, manageable and sustainable.

A timely financing and implementation of the project is therefore highly recommended in order to realise the anticipated benefits outlined in this study/report.

Provided all other economic factors remain substantially the same, it is strongly recommended that the project be implemented with immediate effect. Since the promoters are in the process of getting Processing Licence for the proposed processing site, and likewise developing their Environmental Management, it is further recommended that an application for TIC Certificate of Investment Incentives be submitted to Tanzania Investment Centre with a view to benefit from investment benefits and protection as statutorily allowed under Tanzania Investment Act, 2022.

NEERIKA HOLDING AND GENERAL SUPPY FINANCIAL PROJECTIONS	Unnamed: 1	Unnamed: 2	Unnamed: 3	
PROJECT SUMMARY SHEET				
PROJECT TITLE: NEERIKA HOLDING AND GENERAL SUPPLY LIMITED				
Project Description:	Setting up gold mining and processing facilities at Nyarugusu Village, Geita District Nyarugusu, Geita Region Total project cost estimated at US$ 917,000- and working capital 100,000-. Processing capacity ia about 10,080 metric tons of gold ore per annum with recovery rate of 4 grams per ton, translating to 40,320 grams per annum. Gold price is set at USD 88 per gram. Job creation is estimated at 44.			
Project Classification:	New Project			
Construction phase:	10/24 - 12/27			
Production phase:	5/25 - 12/35			
Length:	10 years			
Accounting currency:	United States Dollar (US$)			
Units:	Absolute			
Local currency:	Tanzania Shilling (TShs)			

Exchange rate:	1.0000 US$ = 2,700.0000 TShs					
INVESTMENT COSTS						

	Total Construction	Total Production	Total Investment
Total fixed investment costs	879000	0	879000
Total pre-production expenditures	38000	0	38000
Pre-production expenditures (net of interest)	38000	0	38000
Increase in net working capital	0	97460.46	97460.46
TOTAL INVESTMENT COSTS	917000	97460.46	1014460.46

INCOME AND COSTS, OPERATIONS

	First Year	Reference Year	Last year 28
SALES REVENUE	604800	604800	1411200
Mining and Processing Costs	425007	425007	1040284
Administrative overhead costs	54940	54940	109880
OPERATING COSTS	479947	479947	1150164
Depreciation	40750.63	40750.63	7220
Financial costs	29716	29716	0
TOTAL PRODUCTION COSTS	550413.63	550413.63	1157384

Marketing costs	18000	18000	18000	
COSTS OF PRODUCTS	568413.63	568413.63	1175384	
GROSS PROFIT FROM OPERATIONS	36386.38	36386.38	235816	
Depreciation allowances	41044	41044	11000	
GROSS PROFIT	-4657.63	-4657.63	224816	
Investment allowances	129250	129250	0	
TAXABLE PROFIT	0	0	224816	
Income (corporate) tax	0	0	67444.8	
NET PROFIT	-4657.63	-4657.63	157371.2	
RATIOS				
Net Present Value of Total Capital Invested	at 8.00%	632221.49		
Internal rate of return on investment (IRR)	0.222			
Modified IRR on investment	0.222			
Net Present Value of Total Equity Capital Invested	at 2.50%	1055106.33		
Internal rate of return on equity (IRRE)	0.2429			
Modified IRRE on equity	0.2429			