NKAMOUNA Co-Ni-Mn PROJECT

FEASIBILITY STUDY

1637-STY-001

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

The Nkamouna Cobalt-Nickel-Manganese Project (Project) includes greenfields development of an open-cut mine, process plant and associated project infrastructure at the Nkamouna site. The Project is under evaluation by Geovic Cameroon PLC (GeoCam) which holds a mining permit which covers the Project site and surrounding areas.

1.2 Ownership

Ownership of the Project holder, Geovic Cameroon P.L.C. is held 60.5% by Geovic Mining Corporation, 20% by SNI, the National Investment Corporation of Cameroon, and 19.5% by other Cameroonian investors who are represented by SNI.

The right to mine held by GeoCam is realised through its Mining Permit. On 11 April 2003, a Mining Permit Decree was issued to GeoCam, covering an area of 1,250 km^2. The permit authorises 1,250 km^2 within a 1,645 km^2 boundary as defined by the coordinates.

Most of the Mining Permit lands are zoned 'mineral exclusive' lands, and assigns GeoCam exclusive rights to the cobalt, nickel and related materials within the Mining Permit.

1.3 Location

The Project is located in the Haut Nyong Division, East Province of Cameroon in Africa. The Project's site is 640 kilometres (km) by road from the seaport of Douala, and about 400 km from the capital city of Yaoundé. The closest town to the Project site is Lomié, approximately 26 km to the west – southwest.

1.4 Environmental and Social Impact Assessment

An Environmental and Social Assessment (ESA) was prepared and submitted to the Ministry of Environment and Protection of Nature in 2006. It was approved by the Ministry in May 2007.

The approved ESA comprises the following documents:

- Executive Summary.
- Environmental and Social Impact Assessment (ESIA).
- Environmental and Social Action Plan (ESAP).

The ESIA describes the existing baseline conditions for the receiving environmental and social conditions. It then overlays GeoCam's development and operating plans onto the receiving environmental and social resources and predicts the impacts associated with Project implementation. It then identifies plausible mitigation measures to reduce adverse impacts to acceptable levels and enhance Project benefits.

The ESAP, which establishes the actions through which the Company will implement its environmental and social management system framework, included specific action plans for certain disciplines that required additional quantification of implementation measures for mitigating Project impacts. They included:

- Waste Management Plan.
- Emergency Response and Contingency Plan.
- Mine Reclamation and Closure Plan.
- Community and Indigenous Peoples Development Plan.
- Public Consultation and Disclosure Plan.

The Community and Indigenous Peoples Development Plan (CDP) describe how GeoCam intends to advance development opportunities to the Baka, an indigenous group. In the 2010 ESA Update, the Company presented a framework for a new Indigenous People's Plan (IPP), which is expected to be prepared in early 2011. This timing is a function of being able to engage with the Baka after they return from the hunting season in the forest in 2011.

A draft Biodiversity Plan describing GeoCam's plans for mitigating impacts to flora, fauna and local habitats was also included in the 2010 ESA Update.

Since approval of the ESA, GeoCam has been diligently moving the Project forward toward construction. However, a number of Project elements have been modified and optimised since the time the ESA was approved in 2007. Consequently, a document was prepared to incorporate these changes entitled the 'Geovic Cameroon PLC, Nkamouna Project, Environmental and Social Assessment 2010 Update' dated March 31, 2010.

GeoCam received a letter from the Ministry of Environment and Protection of Nature dated 3 September 2010 stating that the ESA 2010 Update report provides an appropriate demonstration that the Project continues to move forward and therefore remains in conformity with the regulatory requirements. However, the Ministry requires that GeoCam consolidate the 2007 ESA, the ESA 2010 Update and any other Project modifications that may be put forward in this Feasibility Study into a single document. GeoCam intends to consolidate and reissue the approved ESA, with updates, to provide consistency with the content of this Feasibility Study in the first half of 2011. The updated ESA will be submitted to the Ministry in the first half of 2011, but the updated document may not require Ministry approval since the Project has already been determined to be in conformity with the regulatory requirements.

1.5 Geology

Nickelferous laterite deposits in southeast Cameroon were first discovered and investigated by the United Nations Development Programme (UNDP) during 1981 to 1986, in a cooperative project with the Cameroon Ministry of Mines, Water and Energy (UNDP Project CMR/81/005). Following a regional stream sediment geochemical survey which indicated the likely presence of laterite nickel mineralisation, the UNDP project drilled eleven core holes in the Nkamouna area, which was the most accessible laterite area at that time.

Several of the UNDP holes intersected laterite and saprolite with interesting nickel and cobalt values. The first hole, KG-S-1, traversed 56 m of lateritic profile and fresh serpentinite, with Ni values up to 1.00% and Co values up to 0.19%. Due to the remote location and the low nickel prices at the time, the discovery did not draw much attention.

In mid-1995, GeoCam received a Prospecting Permit that covered 19,600 km^2. In January 1999, the Prospecting Permit was superseded with an Exploration Permit, PDR 67, which covered 4,876 km^2 and specifically allowed exploration drilling. GeoCam's initial exploration programme was based entirely on manually-dug test pits. Later, much larger exploration programs utilised drilling and limited trenching. The programme began in the area designated Nkamouna and was later extended to the other laterite plateaus targeted using satellite image and air photos. Mada, which is a northern extension of Nkamouna, was later incorporated into the overall resource base. GeoCam's core-drilling programme began in 1999, after many hundreds of pits had been completed. A total of 23 holes were drilled (NKM-21 to NKM-43) in the northeast part of West Nkamouna, on an approximate 100 m grid.

In 2002, GeoCam imported an Australian designed, truck mounted machine. Holes drilled with this machine are referred to in GeoCam reports as 'air core' holes, but intact core was not produced, and these holes are more accurately termed reverse circulation drill holes.

In the same year, GeoCam also contracted with a local survey and civil engineering company in Yaoundé to provide digital topography for a 12 km^2 area mapped in detail at Nkamouna. Map survey points are accurate to within 1 cm (X, Y, and Z). The maps are contoured at 1 and 2 m intervals. All pits and drillholes are plotted on this topographic map base.

By 2004, GeoCam had largely completed the reconnaissance sampling and had undertaken pitting and drilling programmes of varying densities at Nkamouna, where access was less restricted due to recent logging operations, in order to define deposit parameters for an eventual preliminary feasibility study.

In 2006, GeoCam completed a programme adding five new test pits and deepening other test pits adding over 730 m of additional sampling in preparation for the final feasibility study.

During 2008 and 2009, GeoCam conducted significant infill and step out drilling and pitting in the Nkamouna, Mada and Rapodjombo areas, including an additional 975 drill holes at Nkamouna, 1,012 drill holes at Mada and 248 reverse circulation holes at Rapodjombo. These new data form the basis for the Mineral Resource estimates and subsequent Mineral Reserve estimate at Nkamouna and Mada in this report.

1.5.1 Drilling

Type and Extent of Drilling

Because the GeoCam deposits are secondary in nature, and represent the decomposition products of bedrock, they present data-generation issues which are typical of laterites. These include sampling of intermixed material, which range from very soft to very hard, and which varies greatly in metal grade from one location to the next, especially in the ferricrete breccia lithologies.

The only drilling on the properties has been at Nkamouna, Mada and Rapodjombo. The majority of all other samples have been obtained by developing test pits or shafts of a nominal 1.2 m diameter to depth of refusal or the water table.

A significant proportion of the sampling at Nkamouna, Mada and Rapodjombo, and nearly all sampling in the other laterite areas, has been conducted by test pitting, with a lesser amount from drilling. Direct sampling of outcrops and trenches is almost entirely limited to Trench 1 at Nkamouna. A second trench was developed in early 2007. Trench 2 was designed to observe the deposit's continuity, reveal the challenges associated with grade control, and determine the mining characteristics for the expected waste and ore horizons.

The types of sample openings as provided to SRK Consulting (SRK) by GeoCam are summarised below in Table 1.5.1, as of October 2009.

Table 1.5.1 Exploration Sample Data

Area	Pits		Diamond Core Holes (UNDP + GeoCam)		Reverse Circulation ('Air Core') Holes		Trenches		Total	
Name	No.	m	No.	m	No.	m	No.	m	No.	m
Nkamouna* (all)	1,310	17,466.34	1034	27,215.05	176	3,674.50	2	n.a.	2,522	48,355.89
Mada*	593	7,283.20	0	--	928	23,751.10	0	--	1,521	5,683.3
Rapodjombo	**	**	0	--	248	6,472	0	--	**	6,472**
North Mang	15	93.2	0	--	0	--	0	--	15	93.2
South Mang	34	312.7	0	--	0	--	0	--	34	312.7
Messea	25	208.4	0	--	0	--	0	--	25	208.4
Kondong	3	3.0	0	--	0	--	0	--	3	3.0
Total (Mining Permit)	**1,980**	**25,366.84**	**1034**	**27,215.05**	**1,352**	**33,897.60**	**2**	**n.a.**	**4,120**	**54,656.49**

* Mada is referred to as 'Kongo' in some older data, while Nkamouna is 'Kongo South'.
** Rapodjombo pits are included in Mada figures.

Results - Interpretation

SRK has conducted a detailed review of all historic and current drilling and pitting programme data, and is of the opinion that the methodology used to collect the samples and that the current sample spacing is adequate for use in resource estimation. SRK notes that the historic core sample analyses conducted by GeoCam are adequate, but is of the opinion that the larger sample sizes afforded by pit and reverse circulation samples are more appropriate, given the coarse grain size and highly variable distribution of asbolane, which is the mineral of economic significance in the Nkamouna and Mada deposits.

1.6 Resource Estimation

The mineral resource estimate was prepared by Alan Noble, P.E., independent consultant, under the direction of Brian Briggs, P.E., Vice President of Technical Services. The mineral resource estimate was prepared using three-dimensional block models to estimate cobalt, nickel and manganese grades for individual 10 x 10 m horizontal by 1 m vertical blocks for Nkamouna and 20 x 20 m horizontal by 1 m vertical blocks at Mada. In addition, lithology and resource classification codes were assigned to each block. This estimate is an update to the feasibility study Nkamouna resource model and the 2007 Mada resource model using additional data from the 2007 to 2009 drill programmes conducted at Nkamouna and Mada. No resource estimate was conducted at Rapodjombo, as drilling is considered insufficient for classification of resources.

1.6.1 Minerals Resource Statement

The mineral resources for the Nkamouna and Mada cobalt-nickel deposits have been audited by SRK at 59.8 million tonnes (Mt) grading an average of 0.24% cobalt, 0.68% nickel and 1.37% manganese classified as Measured Mineral Resources with an additional 60.8 Mt grading an average of 0.22% cobalt, 0.62% nickel and 1.32% manganese classified as Indicated Mineral Resources. An additional 202.5 Mt grading an average of 0.20% cobalt, 0.59% nickel and 1.20% manganese is classified as Inferred Mineral resources. The resource is stated above a 0.12% cobalt cut-off for ferralite and a 0.23% cobalt cut-off for breccias, constrained above the bedrock surface.

The mineral resources are reported in accordance with CSA NI 43-101 and have been estimated in conformity with generally accepted CIM 'Estimation of Mineral Resource and Mineral Reserves Best Practices' guidelines.

Table 1.6.1 Nkamouna and Mada Resource Table

Lithology	Resource Category	Cut-off (%Co)	Tonnes (kt)	Average Grade		
				Co (%)	Ni (%)	Mn (%)
Measured						
Nkamouna	Measured		59,805	0.24	0.68	1.37
Mada	Measured		-	-	-	-
Total	**Measured**		**59,805**	**0.24**	**0.68**	**1.37**
Indicated						
Nkamouna	Indicated		20,918	0.19	0.67	1.12
Mada	Indicated		39,876	0.23	0.59	1.43
Total	**Indicated**		**60,794**	**0.22**	**0.62**	**1.32**
Inferred						
Nkamouna	Inferred		19,929	0.19	0.65	1.09
Mada	Inferred		182,621	0.20	0.58	1.21
Total	**Inferred**		**202,551**	**0.20**	**0.59**	**1.20**

1.7 Mining

The Nkamouna Deposit occurs in a heavily wooded tropical environment located in eastern Cameroon. The Deposit is located in moderately undulating topography covering an area approximately 4.5 km east to west and 2 km north to south and covers an area of approximately 9 km^2. The orebody is semi-circular in shape ranging in depth from approximately 5 m to 30 m and bounded by a shiest contact defining the limit of mineralisation. The deposit contains numerous small drainages which feed rivers systems down-stream of the deposit.

The two ore types breccia and ferralite are targeted for physical upgrading and mined at approximately 10,000 – 20,000 t/d using small excavators and articulated dump trucks (ADTs). Both breccia and ferralite will be transported from the pit face to run-of-mine (ROM) stockpiles located near the plant site in Nkamouna, the southern extent of Mada and an emergency stockpile between the two. From the stockpile fingers holding desired grade, the ore types are transported to the physical upgrade (PUG) plant using front end loaders and haul trucks. Waste is removed through the use of bulldozers and side casting of rehandle with long boom excavators.

The mine production schedule is based on consistent excavation of in-situ ROM material where a unit variable of cycle time multiplied by tonnage is targeted. This variable accounted for haul distance from different parts of the mine to achieve a consistent mining fleet as defined by pre-production requirements. The mine production rate allowed for sufficient high grade breccia and ferralite to be stored in stockpiles for utilisation early in the mine life by the PUG plant. By doing so, the maximum high grade stream during the payback period was exploited from the deposits thus providing the leach and recovery plant with the highest ferralite and breccia concentrate grade possible. Given the accelerated mining during the ramp up period for the leach and recovery plant, ROM material is to be placed in individual grade bin stockpiles for breccia and ferralite. After 10 years of in-situ mining, the lower grade bins that are stockpiled become the major source of feed for the plant. The production schedule estimates a total stockpile storage capacity of 44.6 Mm^3 be built in three locations for ferralite above 0.12% Co and 0.20% Co for breccia. The stockpile is required from a reserve allocation and economic perspective, but is unlikely to be built if additional exploration drilling identifies other high grade low strip ratio resources.

Average annual mining rates over the first 10 years are 6.55 Mt/y of ore stockpiled and 21 Mt/y of waste relocated (not including waste rehandle) with a strip ratio of 3.22:1.

Since the mining and the pre-production earthworks for the plant, tailings dam and infrastructure will be performed by the subsequent mine equipment fleet, relatively large (construction-sized) but small mining-sized equipment has been selected. Initial major equipment will include tracked hydraulic excavators (2.5 m^3 to 6.0 m^3), wheel loaders (6 m^3), dozers (D9 class) and 40 t articulated trucks to cope with tropical conditions in a lateritic environment. This pre-production fleet forms the basis of mine production and when the mine is operational fleet replacements and rebuilds have been costed and scheduled.

Given that Nkamouna and Mada deposits have a relatively shallow ore depth spread over a large aerial extent, strip mining was immediately identified as the lowest cost mining method versus traditional open pit bench advance. A modified open cast procedure was then designed to take advantage of these natural conditions, allowing flexibility in strip advance, ore blending and grade control. The mine method is developed by creating cuts or panels 30 m wide and generally from 200 m to 1,000 m long within the ore reserve outlines. As dozer operation relocates waste, ore is exposed for detailed grade control analysis and liberation through excavators and articulated dump truck transport to designated stockpiles. Waste internal to the mine block and associated re-handle at the mine face is side cast into old workings. Progressive rehabilitation of mine blocks is expected to follow main mine operations.

Table 1.7.1 Nkamouna and Mada Reserves by Rock Type (as of 30 Dec 2010)

Ore Type	Class		Ore Tonnes (000's)	Co Grade (%)	Mn Grade (%)	Ni Grade (%)
Ferralite Ore			**57,097**	**0.23**	**1.30**	**0.69**
Breccia Ore			**11,035**	**0.42**	**2.37**	**0.54**
Total Proven and Probable			**68,132**	**0.26**	**1.48**	**0.66**

Notes:
Reserves are based on a Co price of US$57,761/t (US$26.20/lb) Ni price of US$19,208/t (US$8.713 /lb) and a Mn price of US$1,360/t (US$0.544/lb).
Full mining recovery is assumed.
Mine reserves are not diluted.
Cut-off grades are not representative of internal or break-even calculations but rather stockpile grade bin classification above 0.12% Co for ferralite and 0.2% Co for breccia.
In-situ Co, Mn and Ni grade does not include average metallurgical recovery of 58.66% Co, 16.43% Ni and 53.06% Mn.

1.8 Metallurgy

The metallurgical evaluation centred on the selected process route and the objective was to establish the design parameters in order to engineer the process. This was achieved by conducting small scale batch experiments for each of the unit processes followed by combination of the unit processes in the four pilot plant campaigns.

The extensive testwork provided backup for the selected process route in that acceptable recoveries and product qualities was achieved continuously during the pilot plant campaigns at expected reagent consumptions.

The metallurgical evaluation provided all the required data to design the process plant and auxiliaries. The reagent consumptions for the operating cost estimate were derived from the metallurgical testwork campaigns.

1.9 Process and Plant

The process plant consists of two process circuits namely the physical upgrade (PUG) plant, more commonly known as a wash plant, and the leach and recovery circuit.

1.9.1 Physical Upgrade Plant

The objective of the physical upgrade (PUG) plant is to remove most of the non-economic material, thereby eliminating the requirements to construct a leach and recovery circuit to be able to treat the whole ore. This is achieved by utilising the physical characteristics of the harder, coarser and denser cobalt, nickel and manganese-bearing minerals and that of the fine gangue material.

The objectives of the individual unit operations within the PUG circuit are presented in Table 1.9.1.

Table 1.9.1 Objectives of the PUG Circuit

Sub Circuit	Objective
Primary and secondary crushing	To accept mined ore via the ROM Bin and to reduce the ore to minus 100 mm
Paddle mixer and screen	To slurry the minus 100 mm feed material from the crushing circuit and to screen the slurried material to remove plus 6 mm particles
Attritioning and hydrosizer classification	To attrition the material thereby liberating the coarse cobalt rich Asbolane material from the fine gangue material To separate the coarse cobalt rich Asbolane particles from the fine gangue material
Concentrate stockpiling	To create a live stockpile for surge capacity between the PUG circuit and the concentrate grinding circuit To create dead stockpiles of concentrate that may be used to blend the concentrate thereby creating a constant grade to the downstream leach and recovery plant

Extensive testing and studies have demonstrated that unique ore mineralogy and simple concentration prior to leaching substantially enhances Project economics. Over 530 bench-scale tests and five pilot-scale programmes were performed on 100 tonnes of representative Nkamouna ores to define the process and to provide engineering data to design the plant.

Energy consumption for crushing is low (ferralite 2.55 kWh/t and breccia 7.15 kWh/t) since the ore is relatively soft or friable, energy to fluidise is very low (0.267 kWh/t) and most of the ore is already smaller than the screen undersize product. Attrition energy is also relatively low (1.6 to 2.5 kWh/t) since the moderately viscous slurry only requires 6 minutes of residence time at standard impeller tip speeds. The operating variables and ore characteristics that significantly affect PUG operations and performance are described below in general order of importance.

- Ore types of breccia and ferralite - breccia PUG factors are lower and recoveries and weights retained are higher than ferralite.
- Ore grades of breccia and ferralite - PUG performance improves with higher grades, particularly for ferralite.
- Attrition intensity - should be increased until such benefits are surpassed by declining concentrate weights, lower recoveries and increasing energy inputs.
- Concentrate separation sizes - these also relate to performance parameters and should be increased until such benefits are surpassed by consequential reductions in recoveries and concentrate weights.
- Slurry Density - this is only significant for viscosities that are either too low (-25% solids) or too high (+50% solids) to properly operate the attritioning cells.
- Ore feed size – top sizes much beyond a range of 6 to 19 mm will create mechanical, wear and/or other difficulties in the attrition cells and elsewhere.

In late 2007, individual tests were performed on 232 representative ferralite and breccia samples collected from 1 metre intervals having a wide range of ore grades. In 2008, the rejects of these samples were separately combined into a ferralite composite from 152 samples, a breccia composite from 13 samples and a total composite of 165 samples. The results of these comprehensive tests were statistically analysed in 2009 to determine equations for calculating PUG concentrate weights, recoveries and contained values based on the grades of breccia and ferralite ore types.

1.9.2 Leach and Recovery Plant

The leach and recovery plant's objective is to recover cobalt and nickel as a mixed sulphide product and manganese as a manganese carbonate product from the PUG concentrate.

The objectives of the individual circuits within the leach and recover circuits are presented in Table 1.9.2.

Table 1.9.2 Objectives of the Leach and Recovery Circuit

Sub Circuit	Objective
Concentrate grinding	To grind the PUG concentrate in an open circuit configuration to a nominal product size (P_{80}) of 106 µm
Leach	To leach cobalt, nickel and manganese from the PUG concentrate
Primary purification	To precipitate iron and aluminum from the pregnant leach solution (PLS)
Counter current decantation (CCD)	To recover leach solution containing cobalt, nickel and manganese from barren solids
CCD tailings processing	To collect and pump tailings to CCD tailings facility
Leach and purification area scrubber	To scrub off-gasses from the leach and primary purification tanks
Secondary purification	To precipitate more iron and aluminium from the PLS stream To remove precipitated Fe and Al from the PLS stream
Sulphide precipitation	To precipitate cobalt and nickel from the PLS as a mixed sulphide To recover the precipitated sulphide from the barren stream To filter and wash and package the mixed sulphide product to remove entrained process solution from the sulphide product
Tertiary purification	To precipitate the remaining iron and aluminium from the PLS stream To remove the precipitated iron and aluminium from the PLS stream
Manganese carbonate precipitation - 1	To precipitate 95% of the leached manganese as manganese carbonate To remove the precipitated manganese carbonate product from the solution To filter and wash and package the manganese carbonate product
Manganese carbonate precipitation - 2	To precipitate the remaining 5% of the leached manganese as manganese carbonate To remove the precipitated manganese carbonate product from the solution To filter the manganese carbonate precipitate

1.10 Support Facilities and Services

The Project will require the normal support facilities and services typical of a greenfield mine.

These will include the following:

- The existing communications network to be upgraded includes a GSM communication tower and VSAT satellite link to Douala.
- Power station consisting of diesel generators of nominal 16 MW.
- Fresh water supply from the Edjé River and overland pipeline to the plant site fresh water storage pond.
- Security fencing and closed circuit television (CCTV) cameras.
- Fuel storage and a distribution system for the mining fleet and the power station.
- Sewage treatment facilities at the accommodation village and the plant site
- Water filtration plant and potable treatment plant located at the plant site and a pipeline to the accommodation village and the construction camp.
- Waste disposal facilities consisting of a solid water disposal dump, a compactor and incinerator.

1.11 Infrastructure

The Project will require the following major infrastructure:

- Bulk plant site earthworks and plant roads and drainage.
- Construction accommodation and facilities.
- Permanent senior and junior staff village and facilities.
- Main road upgrade from Abong Mbang to Nkamouna Gate (this is approximately 133.5 km and will require widening, bridge works and drainage works).
- Acid plant of nominal 440 tonne per day capacity as 100% sulphuric acid.
- Site buildings including offices, change houses, ablutions, cafeteria, workshops, warehouses, mine and plant laboratory, motor control centres and control rooms.
- Various reagent storage and product storage sheds at site and a container handling compound.

- Facilities at Douala for reagent storage and product storage (approximately 25,000 m^2 of leased sheds will be required).

1.12 Tailings Storage Facilities

The Tailings Storage Facilities (TSFs) will provide separate storage for PUG tailings and CCD tailings. The TSFs will be built within the Napene Creek drainage basin and immediately to its north. Stored tailings will essentially fill the upper end of the Napene Creek basin. The location is excellent for tailing storage, since it reduces offsite run-on to the facilities thus limiting the need to handle excess waters over the project life.

The tailing facilities will be formed by the construction of embankment dams built in four stages (Stages 1 – 4) over the life of the Project to spread capital costs over the mine life while meeting project needs. At build-out in Stage 4, the tailing facilities will extend about 3,500 metres in the north-south direction and 2,200 metres in the east-west direction, and will cover about 4 km^2, about the entire Napene Creek drainage area.

At the end of Stage 4, the PUG TSF embankments will form one embankment enclosing the upper Napene Creek basin. The PUG tailing dams are designed as water retention structures considering (1) the very soft and wet tailing to be stored, (2) the size of the operational water pond and impoundment of water against the dams, particularly against West and South Dams at least during a portion of the mine life, and (3) the need to be able to store extra water in the facility to supply make-up water to the plant during dry periods. Dam crests are based on the tailing and water storage requirement in the facility, freeboard requirements, and accounting for a sloped tailing beach.

The CCD TSF will comprise two, four-sided cells to the north of the PUG TSF. The CCD cells will have geocomposite liners along the inside embankment slopes and basin bottoms. The basin bottoms will also be covered with an underdrainage collection system and protective layer (retardant layer).

The design of the PUG TSF embankments provides for zoned earthfill structures, and the design of the CCD embankments provides for homogeneous earthfill structures. Overburden materials will be removed from the dam ‘footprints’ and replaced with the appropriate embankment fill zones. Underlying materials appear adequate for founding the tailing dams. Construction of the embankments is based on the use of on-site materials.

Results of the operational water balance have been used to size the tailing storage facilities and provide parameters for their operation. This includes parameters related to providing fresh water and return waters to the process facilities, and discharging waters from the facilities to the Edje River. Discharges to the Edje from the PUG TSF are modelled. Controls on the amount of total suspended solids in the discharges to meet water quality guidelines will be implemented. Water discharges from the CCD TSF and the Glauber Salt Plant have been modelled to meet water quality discharge standards, including design of a mixing zone for discharged and Edje River waters, while meeting appropriate water discharge guidelines.

1.13 Tailings Management and Closure

The current PUG TSF tailing deposition concept provides for deposition of the tailing from a series of individual drop bars, strategically located around the PUG TSF perimeter. The intent is to produce a systematic filling, forming a tailing slope from north to south in the facility, and to control the size of the decant pond, maintaining it in the southern portion of the facility. The tailing will be diluted with waters from the PUG decant pond, and then flocculated before deposition to improve sedimentation and decant development rates of this clayey tailing.

The current CCD TSF tailing deposition concept provides for deposition from individual drop bars, strategically located around the CCD TSF cell perimeter. With progressive tailing deposition from the northern and eastern limits of the two cells, the goal is to form tailing beach slopes to the southwest corners of the cells where the decant structures and underdrain collection sumps are located. Conversion to a thin layer, rotational deposition system, as in the PUG TSF, is not anticipated, because the decant ponds are expected to cover significant portions of each CCD cell.

The design and operating criteria for the tailing impoundments consider closure and reclamation of the facilities. Physical stabilization of the PUG and CCD tailing surfaces will be required to allow cover placement over the CCD TSF followed by revegetation.

1.14 Marketing

1.14.1 Introduction

GeoCam anticipates producing two saleable products: a high quality mixed cobalt-nickel sulphide (MSP) and manganese carbonate. The metallurgical processes required to generate these products have been fully tested and demonstrated by pilot testing in the laboratory (Section 9.0). Over the life of the project, some 105,000 tonnes (t) of cobalt, 75,000 t of nickel, and 535,000 t of manganese will be produced. Based on the mining, processing and related Project requirements described in previous sections, GeoCam envisages production rates during the mining years (years 1 to 11) ramping up to about 15,000 tonnes per year (tpy) of mixed cobalt-nickel sulphide product (MSP) and 65,000 tpy of manganese carbonate. Cobalt and nickel derived from the MSP will be about 6,100 tpy and 3,300 tpy, respectively. These production rates will gradually drop off during the processing-only phase from years 12 to 24 after the mining phase is completed if additional resources are not identified during that time to supplement the existing resource base.

1.14.2 Products

The following products have been discussed with potential clients:

- Mixed Sulfide Product (MSP) containing primarily cobalt, nickel, and sulphur.
- High purity manganese carbonate.

1.14.3 Client Interest

During recent years, the objective defined above, has been initiated where the degree of interest has increased as the Project has become better defined and integrated into the Feasibility Study.

The Project timing, commissioning date and evaluation of product samples, further influences various counter-parties as they balance the Project with their other project commitments and developments. Potential clients are listed in the Section 15 and Appendix 15.3.

Potential consumers for the MSP have been identified as parties either operating existing processing facilities or as those considering developing processing facilities, and having the technical and commercial competence to recover, account, and commercially pay for the cobalt and nickel contents at conditions acceptable to the Project. While all sectors of the cobalt market are considered potential target consumers, the projected growth of battery demand for cobalt places greater emphasis toward consumers supplying or anticipating their participation in the battery sector. All of the products - cobalt, nickel, and manganese - are inherent elements to the manufacture of many types of batteries.

Manganese Carbonate product is generating interest from unrelated potential counter-parties owning and operating Electrolytic Manganese Metal (EMM) and Electrolytic Manganese Dioxide (EMD) plants in South Africa, USA, Australia, Japan and China. Interest for this product has been strong and the marketing team is confident that the Project's full production can be consumed at reasonable market conditions.

1.14.4 Mixed Sulphide Product (MSP)

A typical analysis of MSP is shown in Table 1.14.1.

Table 1.14.1 Analysis of Mixed Sulphide Product

Concentration	% w/w
Cobalt	39.6
Nickel	24.0
Sulphur	36.4
Manganese	0.12
Iron	0.35
Aluminium	0.01
Copper	0.18
Zinc	0.84

1.14.5 Manganese Carbonate Product (MnCP)

A typical analysis of MnCP is shown in Table 1.14.2.

Table 1.14.2 Analysis of Manganese Carbonate Product

Concentration	% w/w
Manganese	48.5
Calcium	0.136
Magnesium	0.040
Sodium	1.098
Sulphur	0.361

1.15 Capital and Operating Costs

Table 1.15.1 summarises the capital cost estimate for the Project including contingency. The process plant, support services and infrastructure described in Sections 10, 11, 12 and 13 serve as the basis for the capital cost estimate.

Table 1.15.1 Capital Cost Estimate Summary (4Q10, ±15%)

Main Area	Total USD	%
Construction Indirects	44,369,837	7.19%
Treatment Plant Costs	167,470,300	27.14%
Reagents and Plant Services	40,003,198	6.48%
Infrastructure	117,911,168	19.11%
Mining	36,553,835	6%
Management Costs	73,428,985	11.90%
Subtotal	**479,737,322**	**77.73%**
Owners Project Costs	76,475,587	12.39%
Subtotal	**556,212,909**	**90.12%**
Contingency	60,950,509	10%
Total	**617,163,418**	**100.00%**

Table 1.15.2 Summarises the Operating Cost Estimate for the Project.

Table 1.15.2 Summary Operating Cost (During Mining Years)

Cost Centre	Total Cost		Fixed Cost		Variable Cost	
	USD/annum (Millions)	USD/t ROM ore	%	USD/annum (Millions)	USD/annum (Millions)	USD/t ROM ore
Mining*	24	10.54	0	-	24	10.54
Labour	12	5.45	100	12	-	0.00
Operating Consumables	52	22.77	0	-	52	22.77
Transportation for Consumables	35	15.41	0	-	35	15.41
Product Transportation & Sales	15	6.76	0	-	15	6.76
Power	26	11.42	90	23	3	1.18
Maintenance	11	4.94	33	4	7	3.29
General & Administration	16	7.20	100	16	-	0.00
Total	**$192**	**$84.50**	**29%**	**$56**	**$136**	**$59.96**

* Note: Cost incurred during years 1 to 10 only.

1.16 Operations Plan

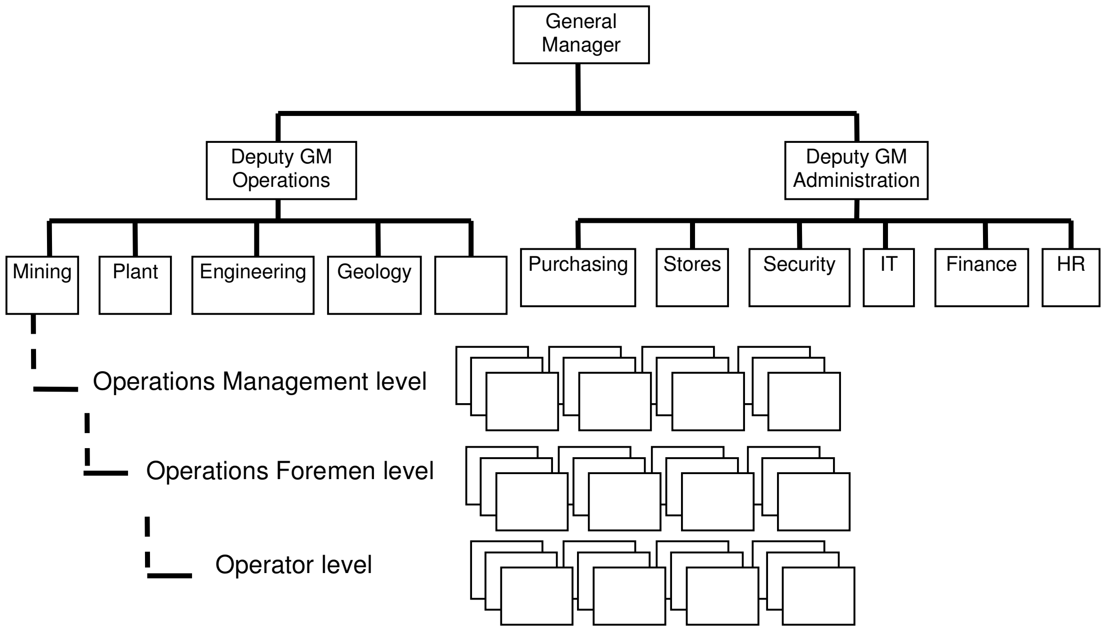
1.16.1 Introduction

GeoCam aims as far as possible to employ Cameroonian citizens, including those from the local area, to work at GeoCam. This will benefit both The Republic of Cameroon, in terms of creating jobs and passing on skills, and GeoCam in terms of benefiting from a cost effective and motivated workforce familiar with working in conditions such as those found at GeoCam.

A typical shift pattern will be 3 months on, 3 weeks off. The plant will operate for 7 days per week. Workers will be split into 3 x 8 hour shifts per day, typically for 6 days per week. The mining function will operate for 6 days per week. Workers will be split between 2 x 10 hour shifts per day, for which shift times may be 6 am to 4 pm and 4 pm to 2 am.

1.16.2 Organisational Structure

The organisational structure is a typical hierarchical structure, clearly defining each employee's role and nature within the structure as outlined below.



1.16.3 Human Resources

Manning levels by department are provided in the table below:

Department and Position	Number
Administration	
Admin Management	13
HR Management	38
Procurement & Logistics	32
Finance	12
Security	68
HSE&C	14
General & Administration	63
Subtotal Administration	**240**
Process Plant	
Process Management	12
PUG Plant	48
Leach & Recovery	64
Acid & Reagents	74
TSF and Pipelines	20
Metallurgical	26
Plant Maintenance	92
Subtotal Process Plant Operating	**336**
Mining (Maximum)	
Mining Management	9
Equipment Operators	121
Mine Maintenance	37
Engineering and Geology	30
Mine / Exploration Laboratory	37
Subtotal Mining Operations	**234**
Total Operations	**810**

1.16.4 Training

The training for the mine facilities is expected to be a long term commitment, which will start long before any production is achieved. As they are recruited, the operations' personnel will be allocated to support the construction, whilst attending basic training.

Recruitment strategy will include early hiring of production employees, in order to complete all required training needed. This will apply the following general guidelines:

- General Management — As required, but over 12-18 months period prior to start-up.
- Maintenance Crews — Gradually, but over the 12-18 months prior to start-up.

- Foremen Approximately 12 months prior to start-up.
- Operators Staged over 8-12 period months prior to start-up.

This strategy will allow the company to achieve many of its goals, with regards to training operating employees, provide on-the-job training to foremen and operators, supply additional manpower to the construction / commissioning management, etc. Overall, by the time the plant has been commissioned, all operating and maintenance employees will be ready to take over.

Administration

The most senior Cameroon based roles will be the Deputy General Manager for Administration, the Finance Manager, and the Human Resources Manager. The senior expatriate roles will be the General Manager and the Deputy General Manager for Operations. The Health and Safety Officer position is likely to be filled by a Cameroon national eventually, but initially would be filled by an expatriate to ensure that appropriate health and safety systems are established early in the Project.

Processing

Senior roles will be filled by expatriates with the requisite experience. Intermediate roles will be filled as far as possible by Cameroonians who have applicable industrial experience.

Operator grades will be recruited locally and given appropriate safety and orientation training on site.

Mining Operators

Initially trainers from the mining equipment suppliers will be brought to the Republic of Cameroon to ensure that full training is given to all operators.

Geology, grade control and mine survey personnel will be filled with on site trained Cameroonian nationals.

The Mine Manager and Mining Engineers are likely to be qualified and suitably experienced expatriates.

Budget

To facilitate training and localisation a budget totalling USD 1,000,000 has been set aside, split between each year of the project.

1.16.5 Remuneration

Table 1.16.1 Manning - Average Monthly Salaries

	Average Salary	On Cost%	On Cost $	Total
Expatriate	$12,400	110%	$14,000	$26,400
Senior Cameroon	$3,800	22%	$800	$4,600
Cameroon	$400	50%	$200	$600

1.16.6 Succession Planning

It is the desire and aim of GeoCam to implement an effective and fast track succession management strategy, thus ensuring that the expatriate employees required at the start up phases are replaced as soon as practically possible without having a negative impact on safety, productivity and efficiency.

1.16.7 Accommodation

At the start of the Project, most employees will reside in the permanent accommodation village, where they will be provided with comfortable accommodation and a choice of African and European style food. A smaller number of personnel will be based in Yaoundé to carry out purchasing, logistical, and administrative functions.

1.16.8 Occupational Health and Safety (H&S)

GeoCam will establish an Occupational Health and Safety system based on a five stage proactive system aimed at identifying health and safety threats, providing first aid and occupational health services, medical services and training and initiating inspection and action.

1.16.9 Security

During operations, security management will involve dialogue with local communities, through the Security Manager, with individual local community representatives and officials. This will ensure that all issues of mutual concern are managed effectively.

The entire lease area will be secured as well as the mining and plant areas within the lease area to prevent access of unauthorised personnel. Access control will be implemented and, where necessary, alternative access routes will be provided to members of the local community.

1.16.10 Operational Readiness Plan

Operational Readiness encompasses a group of activities which ensures that the evolution between construction and operation occurs under optimum conditions. The goal is to establish all the required systems so that the new mine, processing plant, and associated facilities are able to ramp up to production smoothly, safely and sustainably in order to meet the company's operating and commercial expectations.

The Operational Readiness programme will:

- develop an asset management plan
- document organisational requirements
- develop an operating strategy
- develop a control strategy
- develop a maintenance strategy
- develop an 'end of life-cycle' strategy.

1.17 Schedule

A preliminary Project schedule has been developed as part of the study.

The overall design, construct and commission schedule from commencement of engineering to the completion of commissioning of the PUG circuit and the leach and recovery plant is 29.5 months to the end of the commissioning.

Engineering and drafting is scheduled to take place over a 17.5 month period. Construction will occur over a 24 month period. Commissioning of the PUG circuit initially, followed by the leach and recovery plant will occur over a 12 month period. There is considerable overlap between these activities.

The schedule has been prepared and is based on the following significant milestones:

- ESA issued 30/04/2011
- Publish Final Feasibility Study 18/04/2011
- GeoCam board meeting to consider Feasibility Study 19/04/2011
- GeoCam board directive to proceed with 2nd phase optimisation 19/04/2011
- GeoCam board final approval to proceed with Project 28/09/2011
- Debt funding available 30/09/2011
- GeoCam approval to proceed with early engineering 29/08/2011
- Award EPCM contract 29/08/2011
- Commence detailed engineering 30/09/2011
- Start site construction 30/09/2011

- Complete site construction 18/11/2013
- Commence PUG circuit commissioning 12/02/2013
- Complete PUG circuit commissioning 03/06/2013
- Commence leach and recovery plant commissioning 30/07/2013
- Complete commissioning of leach and recovery circuit 24/03/2014

1.18 Threats and Opportunities

A preliminary Project Threats and Opportunities workshop was undertaken by the project the results of which are detailed in Section 21 of the FS. A formal Project threat review workshop will be undertaken in the next phase of the Project to expand and rank the nominated threats and to identify new threats. Suitable measures will be implemented to control the overall Project threat profile.

The primary opportunities are centred on the potential to reduce capital and operating costs and will be explored in detail in the next phase of the Project.

1.19 Financial Analysis

The financial analysis results, shown in Table 20.6.2, indicate an $NPV_{8\%}$ of USD 669 million with an IRR of 22% (after estimated taxes). The estimated payback will be in 41 months (2Q 2017) from the start of production in 2014. The following provides the basis of the LOM plan and economics:

- Proven and probable reserves of 68.1 Mt are included.
- A mine life of 11.0 years, and Project life of 23 years.
- Overall average metallurgical recoveries of 58.66% cobalt, 16.43% nickel and 53.06% manganese over the LOM.
- A cash operating cost of USD25,500/t (USD11.57/pound) cobalt equivalent
- Capital costs of USD839 million, comprised of initial capital costs of USD617 million, and sustaining capital over the LOM of USD 222 million.
- Mine closure costs, included in the above sustaining capital estimate of USD51.2 million.
- No provision for salvage value.

Table 1.19.1 Financial Model Results

Description	Units	Value	Unit Cost (US$/lb-Co)
Production			
ROM Ore Processed	kt	68,132	-
Cobalt Produced	klb	229,843	-
Nickel Produced	klb	163,483	-
$MnCO_3$ Produced	klb	2,478,929	-
Estimate of Cash Flow			
Cobalt Price	US$/lb	$26.20	-
Nickel Price	US$/lb	$8.71	-
$MnCO_3$ Price	US$/lb	$0.54	-
Gross Revenue	**US$000s**	**7,635,149**	**$22.267**
Freight & Marketing	US$000s	(282,651)	($0.824)
Net Revenue	**US$000s**	**7,352,497**	**$21.442**
Gross Income	**US$000s**	**7,352,497**	**$21.442**
Operating Costs			
Mining	US$000s	329,067	$0.960
PUG Plant	US$000s	288,272	$0.841
Hydromet Plant	US$000s	1,920,910	$5.602
Process G&A	US$000s	473,140	$1.380
G&A	US$000s	521,987	$1.522
Ad Valorem Tax	US$000s	152,703	$0.445
Operating Costs	**US$000s**	**3,686,079**	**$10.750**
Cash Costs			$11.574
Operating Margin		**3,666,418**	**$10.692**
Capital			
Mine Equipment	US$000s	112,944	-
PUG & Hydromet Plants	US$000s	565,775	-
TSF	US$000s	97,586	-
Owners Costs	US$000s	11,168	-
Mine Closure	US$000s	51,252	-
Total Capital	**US$000s**	**838,725**	-
Total Tax	US$000s	726,463	-
Cash Flow	**US$000s**	**2,139,019**	-
Present Value @ 8%	US$000s	669,579	-
IRR		22%	-