

## **1.0 EXECUTIVE SUMMARY**

### **1.1 *Overview***

Geovic, Ltd. (Geovic), through its 60.5 percent-owned subsidiary Geovic Cameroon PLC (GeoCam), controls exclusive rights to a large cobalt-nickel laterite province located in southeastern Cameroon. Pincock, Allen & Holt (PAH) conducted a review of a report titled ***Resource Estimate for the Mada Cobalt Deposit***, East Province, Republic of Cameroon, dated November 30, 2005, prepared by Alan C. Noble P.E., Ore Reserves Engineering, Lakewood, Colorado, USA. The Mada project, one of seven deposits, contains 145 million tonnes of inferred mineral resources at average grades of 0.21 percent cobalt, 0.48 percent nickel, and 1.15 percent manganese.

This Technical Report is based in part on information prepared by other parties. PAH has relied primarily on information provided as part Mr. Noble's report. Mr. Noble prepared the report under contract to Geovic, Ltd. He is an associate of PAH and has worked on other projects, including Nkamouna as a PAH associate.

### **1.2 *Location***

Geovic's Cobalt-Nickel Project is located in the Haut Nyong Division, East Province of Cameroon, Africa. The Project's site is 640 kilometers by road from the seaport of Douala, and about 380 kilometers from the capital city of Yaounde. The closest town to the Project site is Lomie, at approximately 33 kilometers to the west – southwest. The closest railroad transport to the Project is at the town of Belabo, at a distance of approximately 250 kilometers. International airports and modern telecommunication facilities exist at Yaounde and Douala. Suitable shipping and receiving facilities exist at the international seaport of Douala.

### **1.3 *Project Ownership***

The mining rights held by GeoCam, consist of a Mining Permit covering a total surface of 1,631 square kilometers, which includes approximately 337 square kilometers of cobalt-nickel mineralized lands. Most of the Mining Permit lands are zoned "mineral exclusive" lands.

The Mining Convention was signed on July 31, 2002 by the Ministry of Mines, Water, and Power of the Republic of Cameroon. On April 11, 2003, a Mining Permit was issued to GeoCam, covering an area of 1,631 square kilometers.

Geovic's participation in the Mining Permit holder GeoCam is 60.5 percent (55.5 percent direct corporate holding by the US-based Geovic, Ltd., plus 5.0 percent held by Geovic's founder). The 39.5 percent balance is currently held by four Cameroonian individual shareholders with 19.5 percent, and 20 percent by SNI a Cameroon government investment corporation.

## **1.4            *Geology***

Southeastern Cameroon lies within a region of metamorphosed Proterozoic rocks ranging in age from 600 to 1,800 million years and extending across much of west-central Africa. In southeastern Cameroon, several assemblages of such metamorphic rocks occur, including cobalt, nickel and manganese enriched laterite profiles that resulted from the weathering of serpentinites. The Mada deposit is one of seven deposits hosted in residual laterites that have formed by prolonged tropical weathering of serpentinites. Large areas of mineralized laterite, some of which are several tens of square kilometers in extent, have been preserved on low-relief mesas or plateaus underlain by ultramafic rocks that stand over the surrounding dissected lowlands. The lowlands are underlain by schists, phyllites, quartzites and meta-volcanics.

The Cameroon laterite profiles show a strong vertical zonation, which reflects the transition from un-weathered host rock at the base, to highly leached residues at the surface. The Cameroon laterites depart from the norm somewhat, in possessing two layers of iron-rich laterite, between which lies ferricrete breccia. The portion of the profile under the breccia includes limonitic ferralite and underlying saprolite units that are more typical of humid tropical laterite profiles.

## **1.5            *Mineralization***

The Mada mineralization is unusual in terms of mineralogy as all the cobalt, approximately half the nickel and nearly all the manganese is contained in the mineral asbolane. Asbolane is a relatively hard mineral that is uniquely coarse in these particular deposits. Mada is atypical of nickel laterite deposits in its high Co:Ni ratio, high cobalt grade, abundant maghematite, thickness of ferricrete breccia and very low content of magnesium oxide.

Of great significance is the size of asbolane agglomerates and wad that host much of the cobalt and almost all of the manganese. Some would describe the deposit as a cobalt-containing manganese ore in a lateritic profile rather than a cobalt laterite. A substantial portion of the cobalt in other laterite deposits is contained in asbolane, but is too fine or too low grade to allow physical upgrading.

## **1.6            *Exploration***

Nickeliferous laterite deposits in southeast Cameroon were first discovered and investigated by the United Nations Development Program (UNDP) during 1981-1986, in a cooperative project with the Cameroon Ministry of Mines, Water and Energy to evaluate mineral potential in southeastern Cameroon. Following a regional stream sediment geochemical survey that indicated the likely presence of laterite nickel mineralization, the UNDP project drilled eleven core holes in the Nkamouna area.

Several of the UNDP holes intersected laterite and saprolite with interesting nickel and cobalt values. The first hole traversed 56 meters of laterite and fresh serpentinite, with nickel values up to 1.00 percent and cobalt values up to 0.19 percent. Due to the remote location and the low nickel prices at the time, the discovery did not draw much attention.

A government-issued Prospecting Permit covering 19,600 square kilometers was granted to GeoCam in 1995. In 1999, an Exploration Permit, PDR 67, was granted on a reduced area of 4,876 square kilometers. A Mining Convention was entered into between GeoCam and the Republic of Cameroon in 2002. In 2003 Mine Permit No. 33 was issued by decree granting to GeoCam the exclusive rights to exploit the deposits within the permitted 1,631 square kilometer area.

GeoCam's exploration program initially was based on manually dug test pits, and later incorporated drilling and limited trenching. The program began at Nkamouna and was later extended to the other laterite plateaus, which were identified by satellite images and air photos. Geologists from the Cameroon Ministry of Mines, Water and Energy participated in the work to provide government oversight as well as training. By 2003, Geovic had largely completed the pitting program at Mada. Much more intensive work was carried out on the nearby Nkamouna plateau, due to the better access there utilizing recent logging roads.

## **1.7            *Resource Modeling***

A mineral resource estimate was prepared for the Mada area using a three-dimensional block model to estimate cobalt, nickel, and manganese grade for individual blocks with dimensions of 10 by 10-meters horizontal by 1-meter vertical. In addition, lithology codes and resource classification codes were defined for each block.

Compared to the Nkamouna deposit, the Mada deposit is reported to have similar geologic properties. Significant differences between the deposits and data are as follows:

1. The potentially mineralized material at Mada covers an area approximately seven times larger than Nkamouna.
2. All Mada samples are pits and most of the pits are not deep enough to penetrate the full thickness of the lower limonite (ferralite) horizon, which is the primary ore-bearing horizon at Nkamouna.
3. The Mada deposit is much more sparsely sampled than Nkamouna. Except for a few fences of pits at 100-meter spacing, sample spacing is on an approximate 500-meter grid. There are 296 pits at Mada, while 1,272 pits and drill holes were used for the Nkamouna estimate or 77 percent fewer sample locations. Considering the greater area of Mada, the sampling density is only 1/30<sup>th</sup> that of Nkamouna.

## **1.8            *Resource Statement***

Resources by definition are in-situ mineral occurrences that are quantified based on geological data, but may not necessarily be economic. Resource classification was established for each block based on the sample grid spacing model. Determination of the appropriate grid size for each resource class was based on the continuity of cobalt above a cutoff grade of 0.10 percent.

The mineral resource is summarized in Table 1-1. The cutoff grades vary based on processing characteristics of each of the lithologic units. All Mada resources are classified as "Inferred Resources."

The Mada resource is summarized using a cutoff grade of 0.12 percent for ferralite and 0.28 percent cobalt for breccia.

**TABLE 1-1**  
**Geovic, Ltd.**  
**Mada Resource Estimate**  
**(Sample Spacing up to 1500 meters, Maximum Extrapolation 420 meters)**

Inferred NN Resource Before Adjustment for Volume-Variance Effects					
Type	Cutoff %Co	Tonnes (1000's)	%Co	%Ni	%Mn
Breccia	0.28	13,200	0.43	0.56	2.87
Ferralite	0.12	118,000	0.21	0.49	1.08
Total		131,200	0.23	0.50	1.26
Inferred NN Resource After Adjustment for Volume-Variance Effects					
Type	Cutoff %Co	Tonnes (1000's)	%Co	%Ni	%Mn
Breccia	0.28	14,300	0.38	0.53	2.53
Ferralite	0.12	130,800	0.20	0.48	1.00
Total		145,100	0.21	0.48	1.15

PAH believes that the resource estimate included in this report conforms to international standards such as the Canadian Institute of Mining (CIM) definitions as adopted by Canadian National Instrument NI 43-101.

### **1.10 Mining**

It is envisioned that the Mada project will be mined as an open-pit utilizing hydraulic shovels and trucks as the primary mining equipment. No mine plan was developed from the resource model.

### **1.11 Metallurgy**

There is no specific physical upgrading or agitation acid leach testwork for the Mada project. There has been many metallurgical studies conducted for the Nkamouna project and a prefeasibility study was completed in March 2006. However, it is anticipated that the mineralization and metallurgical processes for both Nkamouna and Mada will be similar, based on mineralogical characterizations performed by Pittsburgh Mineral & Environmental Technology (PMET) on samples from Nkamouna, Mada, and Rapodjombo.

A bulk sample was taken from 25 Mada pits (53, 1-meter samples) that were metallurgically tested by Metcon (Tucson, Arizona) and compared to the Nkamouna metallurgical tests. The Mada and

Rapodjombo metallurgical samples were found to be consistent with the Nkamouna column (heap leach) tests.

In 2002 Pittsburgh Mineral & Environmental Technology identified asbolane as the host of the cobalt in the Cameroon deposits.

### ***Testwork for Physical Upgrading (PUG)***

Several investigators determined that a simple physical sizing process could produce an asbolane concentrate. The concept of dis-aggregation and separation of the uniquely coarse asbolane in this ore from the fine, soft waste and low-grade material was firmly established. The finer grained, softer ferralite ore type responded more favorably than the harder breccia ore types.

Encouraged by these results, a comprehensive upgrading program was initiated at MSRDI. The program included scrubbing/attritioning of a variety of lithologic samples with and without wetting agents and pH modifiers. MSRDI evaluated particle separations at sizes ranging from 8 to 200-mesh. The objective was to optimize project economic performance not metal recoveries.

### ***Testwork for Metal Recovery Plant (MRP)***

Hazen Research, Inc prepared a composite sample from the test concentrates produced by MSRDI. Hazen completed a comprehensive series of bench-scale tests investigating the dissolution of the asbolane concentrate, purification of the resulting leach solution, solvent extraction and production of cobalt, nickel and manganese products. Hazen also completed a prefeasibility study of the Metals Recovery Plant (MRP) for Nkamouna. This study concentrated solely on the leaching and metals recovery operations. It included a conceptual design, preliminary equipment selection and capital and operating costs of several alternative scenarios.

## **1.12 Processing**

Processing this unique material starts with crushing, attritioning and particle sizing to produce a high-grade, coarse concentrate. Mineralized material will be fed to the PUG plant. The plant basically consists of a receiving hopper and two stages each of crushing, attritioning and particle classifying to produce coarse, high-grade concentrates (-1 inch x +48 mesh), low-grade middlings (-48 mesh x +200 mesh) and fine tailings (-200 mesh). The concentrate will be conveyed to a receiving bin at the process plant. The simplified procedures described below were developed by Hazen Research to process the PUG concentrate at the MRP:

- Grind to 80 percent minus 100-mesh for optimum leach performance.
- Leach with sulfurous acid in four agitated tanks under atmospheric pressure and at a temperature of 70° C.

- Separate leached solid tailings from the Pregnant Leach Solution (PLS) by a series of six counter-current decantation thickeners.
- Condition PLS to consume all sulfite and remove aluminum, iron, copper and zinc prior to SX.
- Concentrate, purify and separate cobalt and nickel in a two-stage SX circuit using hydrochloric acid as stripping agent.
- Convert cobalt and nickel chloride solutions to high purity, marketable oxides (78+% metal) while regenerating hydrochloric acid using spray roasters.

### **1.15            *Tailings Disposal and Management***

As currently envisioned, there are four waste and low-grade streams from the process. Two from the PUG plant, and two from the MRP. The PUG plant feed is a nominal 7,000 tpd with 1,500 tpd of product to the MRP, 4,700 tpd of PUG tailings, and 800 tpd of middling concentrates. The PUG middling concentrates will be stored in a segregated area of the mine backfill. The PUG tailings will be disposed of in a tailings storage facility.

The two waste streams from the MRP are the manganese precipitate and the CCD leach tails. The manganese precipitate is stored in a segregated area of the mine backfill (~ 55 tpd) and the CCD leach tails (~ 1,385 tpd) are disposed with the PUG tails in a tailings storage facility.

The following options will be evaluated for processing mineralized material from Mada.

- Truck the Mada mineralized material to the Nkamouna PUG and MSP plants.
- Install a PUG plant at Mada and truck concentrates to the Nkamouna plant.
- Install a new PUG and MRP in the north Mada area.

Depending on the process decision from the above options, after the Napene Creek tailings storage facility is filled to capacity, tailings from additional Mada resources could be piped to other alternate tailings disposal areas currently being considered within a 4 kilometer radius of the Nkamouna plant site.

### **1.16            *Regional Infrastructure***

The Project is located in the East Province of Cameroon, about 640 kilometers by road from the seaport of Douala, and 380 kilometers from the capital city of Yaounde. International airports and modern telecommunication facilities exist at Yaounde and Douala. Douala also has adequate seaport facilities to meet all foreseeable needs of the Project. Railroad transport is not planned for use since service is limited and the closest siding is 250 kilometers northeast of the Project.

Access to the Project from the seaport of Douala is by a paved highway via Yaounde to Ayos. A reasonably well-maintained, two-lane gravel road extends in 90 kilometers from Ayos to Abong Mbang. Lomie is reached by turning south from Abong Mbang on a narrow dirt road for 127 kilometers. Lomie is the only town of any size in proximity to the Project, which is 30 kilometers to the east. Driving from Yaounde to the Project takes about 8 hours.

## **1.17 Study Conclusions**

Key findings of the Technical Report are summarized below:

- Pincock Allen & Holt (PAH) estimates that the Mada deposit contains an inferred resource of 145 million tonnes at a grade of 0.21 percent cobalt and 0.48 percent nickel. Resources are based on definitions in Canadian National Instrument 43-101 and meet other international standards.
- The deposit averages approximately 4 meters in depth and is relatively simple to mine. Most mineralization is contained in one interval averaging 4 meters thick.
- Metallurgy is straightforward using attritioning and size separation to produce a high-grade concentrate while rejecting nearly 80 percent of the run-of-mine material as waste and low grade. Concentrate leaching is at low temperature and atmospheric pressure, followed by solvent extraction and pyrohydrolysis to produce high-purity cobalt and nickel oxides. The Mada mineralization is substantially lower in acid consuming constituents than most other laterite deposits.
- GeoCam's mining rights were secured from the Republic of Cameroon via a Mining Convention issued in 2002 and a 25-year Mining Permit decreed in 2003 that covers 1,631 square kilometers and is renewable for the life of the resource. Business incentives were granted in 2002 when the project was designated a Strategic Enterprise Regime.
- Substantial resources occur in the Mada deposit on GeoCam's Mine Permit that may feed the initial Nkamouna plant for several additional years.

### **1.17.1 Adequacy of Procedures**

PAH and various other firms and independent consultants have reviewed the methods and procedures utilized by Geovic at the Mada Project to gather geological, geotechnical, and assaying information and found them reasonable and meeting generally accepted industry standards for a technical report.

### **1.17.2 Adequacy of Data**

PAH believes that Geovic has conducted exploration and development sampling and analysis programs using standard practices, providing generally reasonable results. PAH believes that the resulting data can effectively be used in the subsequent estimation of resources.

### **1.17.3 Adequacy of Technical Report**

This Technical Report is based on the report titled *Resource Estimate for the Mada Cobalt Deposit*, East Province, Republic of Cameroon, dated November 30, 2005, prepared by Alan C. Noble P.E., Ore Reserves Engineering, Lakewood, Colorado, USA. The report was prepared using standard industry practices and provides reasonable results and conclusions.

### **1.17.4 Compliance with Canadian NI 43-101 Standards**

PAH believes that the current degree of evaluation is sufficient for generating a technical report for use in resource estimation. Recovery and cost estimates are based upon data from the Nkamouna project Preliminary Feasibility Study to support the cutoff grades used in the resource statement.

At a 0.12 percent cobalt cutoff grade in the limonite and ferralite, and a 0.23 cobalt cutoff grade in the breccia the inferred resource is 145 million tonnes at a cobalt grade of 0.21 percent and a nickel grade of 0.48 percent.

PAH believes that the resource estimates have been calculated utilizing acceptable estimation methodologies. PAH is also of the opinion that the classification of resources, stated in Table 1-1, meet the definitions as stated by Standards for Disclosure for Mineral Projects, Form 43-101F1 and Companion Policy 43-101CP dated December 23, 2005.