# Namdini Gold Project Preliminary Economic Assessment

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7.0 Mtpa option – Pre-tax NPV sensitivity at 5% discount (US$ M)

7.0 Mtpa option – Pre-tax Internal Rate of Return (%)

7.0 Mtpa option – Post-tax NPV sensitivity at 5% discount (US$ M)

Mtpa option – Post-tax Internal Rate of Return (%)

Overall Process Flow Diagram

Cardinal Resources Limited (ASX:CDV) (TSX:CDV) (“Cardinal” or “the Company”) is pleased to announce results of its Preliminary Economic Assessment (“PEA”, NI 43-101) / Scoping Study (“SS”, JORC 2012) for the Namdini Gold Project (“Namdini”) in Ghana, West Africa.

HIGHLIGHTS

- The PEA confirms Namdini to be a technically and financially robust low-cost mining opportunity, with potential to generate strong positive cashflows
- Development is based upon a large, single, open pit with a phase 1 smaller and higher-grade starter pit of circa 1 Moz produced through a conventional SAG mill, Flotation and CIL circuit
- The PEA evaluated three production throughput rates, 4.5, 7.0 and 9.5Mpta; all resulted in strong returns. The preferred scale of development is to be selected following completion of Feasibility Studies. In addition, consideration is being given to a phased approach to the development of Namdini, commencing with a 4.5mtpa throughput that would be designed for expansion to a higher throughput
- Dependent upon the eventual production scenario chosen;
  • Average annual gold production ranges from 159,000 ozpa up to 330,000 ozpa
  • All-in sustaining costs range from US$ 701/oz to US$ 794/oz
  • Development capital costs range from US$ 275M to US$ 426M
  • Strip ratio for all scenarios at 1.2:1 waste to ore
  • Potential life of mine for 9.5 Mtpa option of 14 years, 7.0 Mtpa of 19 years and 4.5 Mtpa of 27 years
- Resource drilling has continued; updated Mineral Resource estimate expected in Q1 2018
- A 15-year renewable Mining Licence has been granted and has been transferred to Cardinal Namdini Mining Limited, a wholly owned subsidiary of Cardinal

- Value enhancement opportunities have been identified and will be considered by the technical team as part of the Pre-Feasibility Study that has now commenced. These include:
  • Detailed metallurgical drilling of large diameter core (PQ size) to obtain specific metallurgical samples of oxide, transition and fresh zones within the proposed open pit
  • Definition of a shallow and higher-grade, potential starter open pit
  • Update detailed design and costings of the proposed processing plant
  • Update detailed mining and processing costs based on the new metallurgical data

PRELIMINARY ECONOMIC ASSESSMENT - CAUTIONARY STATEMENTS

*The Preliminary Economic Assessment (“PEA”) referred to in this announcement has been undertaken to determine the potential viability of an open pit mine and gold processing plant to be constructed at the Namdini Gold Project in Ghana. The purpose of the PEA is to determine the probable scale of such a plant and to determine whether to proceed with more definitive feasibility studies. This study is based on low-level technical and economic assessments that are not sufficient to support the estimation of Ore Reserves. Further exploration and evaluation work and appropriate studies are required before Cardinal Resources Ltd. will be in a position to estimate any Ore Reserves or to provide any assurance of an economic development case.*

*The PEA is preliminary in nature and it includes Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that the PEA will be realized.*

*The PEA is based on the material assumptions outlined in this document. These include assumptions about the availability of funding. While Cardinal considers all of the material assumptions to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes indicated by the PEA can be achieved.*

*The PEA includes existing Indicated Mineral Resources (81%) and Inferred Mineral Resources (19%) defined within the project. There is a lower level of geological confidence in Inferred Mineral Resources and investors are cautioned that there is no certainty that further drilling will result in the upgrade to Indicated Mineral Resources, or that the Production Target will be realized.*

*To achieve the range of outcomes indicated in the PEA, excluding working capital, funding in the order of US$275M - US$426M is assumed to be required. Investors should note that there is no certainty that Cardinal will be able to raise that amount of funding when needed. It is also likely that such funding may only be available on terms that may be dilutive to or otherwise affect the value of Cardinal’s existing shares.*

*It is also possible that Cardinal could pursue other “value realization” strategies such as sale, partial sale or joint venture of the project. If it does, this could materially reduce Cardinal’s proportionate ownership of the project.*

*Given the uncertainties involved, investors should not make any investment decisions based solely on the results of the PEA.*

*Key components of the PEA and the Material Assumptions used in the PEA are contained within this announcement. Information includes preliminary pit optimizations, estimated mine production schedules, metallurgical recoveries from existing testwork and costs based on comparison with similar operations and estimates provided by mining and engineering contractors. The basis of the Material Assumptions is presented in the following section.*

*A detailed NI43-101 report will be posted* on http://www.sedar.com *within 45 days of this announcement.*

FINANCIAL SUMMARY OF PEA

| KEY ECONOMIC RESULTS | UNIT | 4.5 Mtpa | 7.0 Mtpa | 9.5 Mtpa |
|---|---|---|---|---|
| Development Capital Cost | US$ M | 275 | 349 | 426 |
| All in Sustaining Costs (AISC)[1] | US$ / oz | 794 | 736 | 701 |
| Total Project Payback | Years | 4.0 | 3.5 | 3.3 |
| Pre-Tax NPV USD (@ 5% discount)[2] | US$ M | 706 | 913 | 1,036 |
| Post-Tax NPV USD (@ 5% discount)[2] | US$ M | 445 | 574 | 649 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pre-Tax IRR | % | 42 | % | 54 | % 62 | % |
| Post-Tax IRR | % | 31 | % | 39 | % 44 | % |

Table 1: Key Economic Results

*Table 1 Notes:*
*[1] Cash Costs + Royalties + Levies + Life of Mine Sustaining Capital Costs (World Gold Council Standard)*
*[2] Royalties calculated at flat rate of 5% & corporate tax rate of 35% used; both subject to negotiation*.

PRODUCTION SUMMARY

| | | | | |
|---|---|---|---|---|
| RESOURCE DATA USED – SEPTEMBER 2017 | | | | |
| Indicated Mineral Resource | 91 Mt @ 1.1 g/t for 3.3 Moz (81%) within Life of Mine Pit *at 0.5 g/t cut* | | | |
| Inferred Mineral Resource | 22 Mt @ 1.1 g/t for 0.8 Moz (19%) within Life of Mine Pit *at 0.5 g/t cut* | | | |
| KEY ESTIMATED PRODUCTION RESULTS | UNIT | 4.5 Mtpa | 7.0 Mtpa | 9.5 Mtpa |
| Gold Price | US$ / oz | 1,300 | | |
| Average Annual Production – Gold | (oz / yr) | 159,000 | 211,000 | 333,000 |
| Life of Mine Production - Gold | (oz) | 3,524,000 | 3,506,000 | 3,521,000 |
| Average Mine Head Grade | g/t Au | 1.1 | | |
| Metallurgical Recovery (Oxide / Fresh) | % | 90 / 86 | | |
| Resource Mined at 0.5 g/t cut-off grade | Tonnes | 113,000,000 | | |
| Life of Mine Strip Ratio | W:O | 1.2 : 1 | | |
| Mine Life | years | 27 | 19 | 14 |
| Development Capital Cost (including owners cost and 15% contingencies) | US$ M | 275 | 349 | 426 |
| Life of Mine Sustaining Capital Cost (including reclamation) | US$ M | 172 | 160 | 154 |
| All in Sustaining Costs (AISC)[1] | US$ / oz | 794 | 736 | 701 |

Table 2: Key Estimated Production Results

*Table 2 Notes:*
*[1] Cash Costs + Royalties + Levies + Life of Mine Sustaining Capital Costs (World Gold Council Standard)*
*(Assumes flat gold price of US$1,300/oz over mine production)*

Key Study Outputs Include:

• Dependent upon the eventual production scenario chosen;

- Average annual gold production ranges from 159,000 ozpa at 4.5 Mtpa up to 330,000 ozpa at 9.5 Mtpa
- NPV ranges from US$ 706M up to US$ 1,036M pre-tax and US$ 445M up to US$ 649M post-tax
- IRR ranges from 42% to 62% pre-tax and 31% to 44% post-tax
- Payback ranges from 4.0 to 3.3 years and
- All-in sustaining costs range from US$ 701/oz to US$ 794/oz

• The target Life of Mine pit includes 91Mt @ 1.1 g/t for 3.3 M oz (81%) of Indicated Mineral Resource and 22 Mt @ 1.1 g/t for 0.8 M oz (19%) of Inferred Mineral Resources at a 0.5 g/t cut off using the September 2017 Mineral Resource Estimate data

• Identification of a higher-grade starter pit yielding >1 Moz gold with a <0.9 strip ratio for which further optimisation will be performed in the next study phase

• Mineral Resource categories of 81% Indicated and only 19% Inferred within the LOM pit

• A new conventional gold plant inclusive of flotation and regrind - CIL of the flotation concentrate

Given that the PEA results in a strongly positive cashflow outcome for all three throughput scenarios considered, further evaluation and trade-offs for improved economies of scale, mine scheduling, plant design and costings which are anticipated to further enhance project economics will be performed under the Pre-Feasibility Study (“PFS”) which has commenced.

Comments from Archie Koimtsidis, Managing Director and Chief Executive Officer:

“Given the scope of detailed investigations that have been performed leading up to the preparation of the Preliminary Economic Assessment, the outcomes present a strong case on both technical and economic grounds for proceeding to the development of our Namdini Project in Ghana.

“Highly accredited global firms including Golder Associates, Lycopodium, Knight Piesold and Oreway Mineral Consultants were engaged to perform engineering and cost estimation for this study. They are all well-positioned to assist Cardinal through the next study and development phases of the Namdini Project given their past and recent experience in consulting on successful project developments in West Africa.

“The Namdini gold deposit has been extensively drilled and the Mineral Resource estimate has been confirmed by various international independent geological and mining engineering consultants.

“We are continuing with a comprehensive metallurgical programme at ALS in Perth, who are an internationally recognised laboratory, with the intent of optimising the metallurgical process and design criteria for the next phase of studies.

“We now have a compelling business case to move into the Pre-Feasibility and Definitive Feasibility Study phases. These studies will form the basis for the development of our Namdini Project in Ghana.

“We have engaged with the local community for over 20 years; they are fully supportive of this project and the development of Namdini. They appreciate the opportunity that Namdini presents to all stakeholders and its importance to the economic development of Northern Ghana.”

FORWARD PLANS AND VALUE ENHANCEMENT OPPORTUNITIES

From the robust PEA results, the company is continuing to investigate potential improvements in metallurgical recovery, further resource increases concomitant with conversion of Inferred Resources to Indicated Resources and to completion of geotechnical and Tailings Storage Facility studies.

The company is now at the regrind phase of metallurgical test work following successful grinding and flotation test work which has confirmed earlier testing. The regrind of the concentrates is being conducted at various sizes with the intention of determining the trade- off between recovery and operating requirements. It is anticipated that metallurgical results should become available through the next quarter leading up to the completion of the PFS.

Company news flow expected for H1 2018 includes:

- Namdini resource infill drilling results leading to a Mineral Resource update
- Namdini metallurgical optimisation results
- Regional exploration and drilling campaign results

INVESTMENT METRICS

Based upon Life of Mine production and cost parameters, the key investment metrics of the post-tax Net Present Value cashflow forecasts are presented in Table 3. For indicative purposes only, the mid-range throughput of 7.0 Mtpa is presented.

| Post-Tax Real Discount Rate (%) | Gold Price (US$/oz) | | | | |
|---|---|---|---|---|---|
| | US$1,100/oz | US$1,200/oz | US$1,300/oz | US$1,400/oz | US$1,500/oz |
| 0 | 596 | 810 | 1,023 | 1,237 | 1,451 |
| 5 | 318 | 446 | 574 | 703 | 831 |
| 10 | 168 | 251 | 334 | 417 | 525 |

Table 3: 7.0 Mtpa option – Post-tax NPV of Namdini’s Forecast Cashflow – Gold Price Sensitivity

*Note: All NPVs are post-tax and shown in US$M*

The following four bar charts illustrate the 7.0 Mtpa option pre- and post-tax economic sensitivities.

Figure 1 – 7.0 Mtpa option – Pre-tax NPV sensitivity at 5% discount (US$ M)

http://www.globenewswire.com/NewsRoom/AttachmentNg/12dab64b-49bb-4b5b-8ea8-742126366fad

Figure 2 – 7.0 Mtpa option – Pre-tax Internal Rate of Return (%)

http://www.globenewswire.com/NewsRoom/AttachmentNg/45966080-9689-45b4-8d2c-62b86b4fa565

Figure 3 – 7.0 Mtpa option – Post-tax NPV sensitivity at 5% discount (US$ M)

http://www.globenewswire.com/NewsRoom/AttachmentNg/ee21a13e-7a4a-41e7-80bf-239e5662c9d1

Figure 4 – 7.0 Mtpa option – Post-tax Internal Rate of Return (%)

http://www.globenewswire.com/NewsRoom/AttachmentNg/3da9b844-e099-4d69-91c7-7c1f8c534b4b

NAMDINI GLOBAL MINERAL RESOURCES

Independent mining industry consultant, MPR Geological Consultants Pty Ltd (“MPR”) was commissioned by Cardinal to estimate the Mineral Resources of the Namdini deposit. The Mineral Resource estimate was reported in accordance with the 2012 Australian Code for Reporting of Mineral Resources and Ore Reserves (JORC Code) (Refer to Appendix 1 – JORC Table 1). The Mineral Resource estimate, summarized in the following table (Table 4), reports the Resources by category and weathering profile above a 0.5 g/t gold cut-off grade. The classification categories of Inferred and Indicated Resources under the JORC Code (2012) are equivalent to the CIM categories of the same name (CIM, 2014).

| Category | Weathering Profile | Tonnage (Mt) | Grade (g/t Au) | Contained Gold (Moz) |
|---|---|---|---|---|
| Oxide | | 3.92 | 1.1 | 0.14 |
| Indicated | Transitional | 4.38 | 1.1 | 0.15 |
| Fresh | | 112.1 | 1.1 | 3.98 |
| Total *Indicated* Mineral Resource | | 120.4 | 1.1 | 4.27 |
| | Oxide | 0.18 | 0.8 | 0.005 |
| Inferred | Transitional | 0.11 | 1.0 | 0.004 |
| | Fresh | 84.0 | 1.2 | 3.11 |
| Total *Inferred* Mineral Resource | | 84.3 | 1.2 | 3.12 |

Table 4: Namdini Mineral Resource Estimate at 0.5 g/t cut off – September 2017

Since the release of the previous Mineral Resource estimate in September 2017, a further 15,600 metres of drilling have been completed. Once all assay data is received for this subsequent drilling, a new Mineral Resource update will be provided, which is expected to be released in Q1 2018.

Geology

The Namdini gold deposit is a large, structurally controlled, orogenic gold deposit with numerous features similar to deposits found elsewhere in late Proterozoic Birimian terranes of West Africa. The Namdini gold deposit has so far been delineated over a strike length of 1,150m by 300 m wide and 650m deep and is situated within the Nangodi Greenstone Belt.

In 2016, geological consultants from Orefind Pty Ltd conducted an on-site structural study and developed a structural framework with controls on, and geometry of, gold mineralization comprising the Namdini deposit.

Orefind concluded that the rock types comprising the Namdini Project included a steeply west dipping Birimian sequence of interbedded, foliated, metasedimentary and metavolcanic units which have been intruded by a medium-grained granitoid and diorite. The southern part of the Project is covered by flat lying Voltaian Basin clastic sedimentary rocks that have been deposited unconformably on the Birimian sequence and postdate mineralization and the host sequence.

Underneath the weathering profile, the Birimian units include metasedimentary, metavolcanic, granitoid (tonalite) and diorite. The metasedimentary and volcaniclastic lithologies have been intensely altered with a resulting pyrite-carbonate-muscovite-chlorite-quartz assemblage. Alteration is most prevalent in the volcaniclastic units. Similarly, the tonalite is extensively altered and has been overprinted by silica-sericite-carbonate assemblages.

In all rock types, the mineralization is accompanied by visible disseminated sulphides of pyrite and very minor arsenopyrite in both the veins and wall rocks. In diamond drill core, the mineralized zones are visually distinctive due to the presence of millimetre to centimetre wide quartz-carbonate veins that are commonly folded and possess yellow-brown sericite-carbonate selvages. Rare visible gold occurs in strongly altered granite and is associated with sub-millimetre wide silica-sericite shears.

Drilling Techniques

The input dataset used for the Namdini Mineral Resource estimate comprises a total of 110 HQ diamond core holes and 165 RC drill holes totalling 69,291 m.

Reverse circulation drilling (5¼ inch diameter) was usually 200 m or less in depth. All reverse circulation holes were downhole surveyed at 30 m intervals.

Diamond drilling was HQ in both weathered and fresh rock. All diamond holes were downhole surveyed at 30 m intervals. All core was orientated.

Sampling

All reverse circulation samples were collected at the drill site over 1 m intervals and split using a multi-stage riffle splitter.

Diamond core was generally sawn in half; with half sent for assaying, and half retained in core trays for future reference. One metre samples were taken and submitted to an independent laboratory for assaying. At the laboratory, both core and reverse circulation samples followed a standard procedure of drying,

crushing and grinding. The pulverised samples were thoroughly mixed on a rolling mat (“carpet roll”) and then 200 g of sub-sample was collected. Internal laboratory checks required at least 90% of the pulp passing 75 microns. A 50 g charge was produced for subsequent fire assay analysis.

Cardinal observed very good recovery of both core and reverse circulation samples and considers the samples to be representative of the mineralization defined by the drilling.

Sample Analytical Methods

Cardinal uses two laboratories for its sample submissions, SGS Ouagadougou Laboratory in Burkina Faso and SGS Tarkwa Laboratory in Ghana. The independent SGS commercial geochemical analytical laboratories are officially recognized by the South African National Accreditation System (SANAS) for meeting the requirements of the ISO/IEC 17025 standard for specific registered tests for the Minerals Industry.

As part of the Cardinal QA/QC, a suite of internationally accredited and certified reference material (standards) and locally sourced blanks were included in the sample submission sequence. The standards cover gold grade ranges expected at Namdini. Interlaboratory umpire analyses were also conducted.

Certified reference material (blanks and standards) were submitted into the sample stream at a rate of 1 in 22 samples. Duplicate samples of reverse circulation chips were taken at a rate of 1 in 22.

No employee, officer, director, or associate of Cardinal carried out any sample preparation on samples from the Namdini Project exploration programme. Drill core was transported from the drill site by a Cardinal vehicle to the secure core yard facility at the Bolgatanga Field Exploration Office only.

All samples collected for assaying are retained in a locked, secure storage facility until they are collected and transported by the SGS laboratory personnel. Retained drill core is securely stored in the core storage facility and pulps and coarse rejects returned from the laboratories are securely stored in the exploration core logging area and at a nearby secure location in Bolgatanga, Ghana.

Geological and structural modelling

Logging, interpretation and modelling were undertaken by Cardinal Resources’ technical staff using Maxwell Geoservices (Perth) “Logchief” software and specialist structural consultants Orefind Pty Ltd, (Davis and Cowan, 2016-2017) resulting in a three-dimensional model of key lithologies, structures and weathering zones.

Mining Methods and Parameters

Trial open pit optimisations were run in Whittle 4X© at a US$1,300/oz gold price to define the base of potentially economic material. Four push-back pits were then selected and full mine designs applied.

The material reported in the Preliminary Economic Assessment is a sub-set of the Mineral Resource which can be extracted from the mine and processed with an economically acceptable outcome.

No Ore Reserves have yet been declared for the Namdini Project. The Company expects to be in a position to provide a maiden Reserve estimate once it has completed a Pre-Feasibility Study on the Namdini Project.

PROCESS PLANT

Annual nominal throughput processing options of 4.5, 7.0 and 9.5 Mtpa were investigated as part of the PEA. An assessment of the comminution circuit identified upper and lower throughput limits as follows:

- 4.5 Mtpa as the largest throughput that could be accommodated by a jaw crusher
- 7.0 Mtpa throughput that could be accommodated with dual pinion mill drives
- 9.5 Mtpa as the largest throughput that could be achieved with dual pinion mill drives

Flowsheet

The treatment plant design incorporates the following unit processes:

- Primary crushing to produce a coarse crushed product
- Coarse crushed ore storage and reclaim to feed the milling circuit
- A SABC milling circuit comprising a SAG mill in closed circuit with a pebble crusher and a ball mill in closed circuit with hydro cyclones to produce a grind size of 80% passing 106 microns
- Gravity concentration and treatment of gravity concentrate by intensive cyanidation and electrowinning
- Flotation of the milled slurry to recover the majority of gold to a low mass (<10%) sulphide flotation concentrate and producing 'throw away' flotation tailings
- Separate thickening of the flotation concentrate and flotation tailings to recover cyanide-free flotation water and to thicken the streams prior to downstream processing
- Regrind of the flotation concentrate prior to feeding the CIL circuit
- A CIL cyanidation circuit to leach and adsorb gold values from the reground flotation concentrate onto activated carbon
- A split AARL elution circuit, electrowinning and gold smelting to recover gold from the loaded carbon to produce gold doré bars
- A $SO_2$ / oxygen cyanide destruction circuit to reduce the CIL tailings cyanide concentration to below the maximum International Cyanide Management Code (ICMC) weak acid dissociable cyanide (CNWAD) limits for containment
- Parallel pumping of the cyanide destruction discharge and the thickened flotation tailings to the separate cyanide and non-cyanide tailings storage facilities (TSF)

Figure 5 below indicates the selected PEA flowsheet for the Namdini project:

Figure 5 – Overall Process Flow Diagram

http://www.globenewswire.com/NewsRoom/AttachmentNg/b119298e-fb9f-4b2f-9890-dace93cdde80

FUNDING

Cardinal will utilize a staged funding approach for the ongoing development of the Namdini project.

Cardinal has budgeted for the Pre-Feasibility Study out of its existing cash balance.

The Board believes that there are strong “reasonable grounds” to assume that future funding will be available to fund Cardinal’s pre-production capital for the development of Namdini as envisaged in this announcement, on the following basis;

(a) Cardinal’s Board has a financial track record and experience in developing projects.

Non-Executive Charmain Kevin Tomlinson, possesses over 30 years’ experience in Mining and

Finance within Toronto, Australian and London Stock markets. Mr Tomlinson has extensive experience in development and financing of mining projects internationally.

Non-Executive Director Jacques McMullen has had a distinguished 35-year career in the mining industry of which the last 17 years were with Barrick Gold Corp. where he held the positions of Senior VP Special Projects and Technical Services. In his role as Senior VP of Barrick, Jacques was instrumental in the development of many mines including Goldstrike, Veladero, Lagunas Norte, Cowal and Bulyanhulu. His experience includes all phases of development including feasibility, construction, commissioning, ramp-up and operation’s optimization.

(b) Cardinal is confident there is a strong possibility that it will continue to increase mineral resources at the project to extend the mine life beyond what is currently assumed in the PEA.

(c) The gold price is currently trading at approximately US$1,350/oz which compares favourably to the project’s base case assumption of US$1,300/oz. The recent improvement in market conditions and an encouraging outlook for the gold market enhances the Company’s view of the ability to finance the Namdini project.

(d) The strong production and economic outcomes delivered in the Namdini PEA are considered by the Cardinal Board to be sufficiently robust to provide confidence in the Company’s ability to fund its pre-production capital through conventional debt and equity financing.

Cardinal is in early stage discussions with a number of banks and substantial mining investment funds with a view to fund Namdini in stages to production. These financiers have extensive track records of funding similar stage companies through the PFS and DFS stages, construction financing and into commercial production.

STUDY PARAMETERS AND MATERIAL ASSUMPTIONS

Study Status

The study, including capital estimates, mining and processing costs, was completed to an accuracy of +/-40% with a 90% level of confidence and was undertaken based on only open pit mining from the existing resources. The proposed plant comprises an initial single-stage crushing, milling (SAG + ball), gravity circuit (Knelson Concentrator) flotation, concentrate regrind circuit and a CN/CIL circuit.

Three production throughputs were assessed by Lycopodium, namely 4.5, 7.0 and 9.5 Mtpa.

The metallurgical testwork carried out to date indicates that gold can be satisfactorily recovered from Namdini ore using conventional flotation, regrind and Carbon In Leach (CIL) of the flotation concentrate. The testwork is considered sufficient to determine that the Namdini Mineral Resource represents a deposit with potential economic extraction.

The estimation of capital costs was prepared by Lycopodium for the process plant and associated infrastructure.

Golder Associates provided open pit mine engineering services. The work comprised collation of input parameters, open pit optimization studies, pit designs and detailed mine schedules. A series of shells from the open pit optimizations were selected and used to generate a Starter Pit and Life of Mine (LOM) production schedule.

Golder Associates provided an estimate of mining, including haulage, rehabilitation and administration costs. Lycopodium provided processing cost estimates.

The financial model was completed as a real model. A LOM financial analysis was performed using the discounted cash flow (DCF) method and varying % real discount rates. The financial analysis was used to determine the potential economic return of the project over the LOM.

The following preliminary schedule is subject to available funding, positive outcomes for the PFS and DFS and favourable timelines for permitting;

| Milestone | Target Timeline |
|---|---|
| Completion of PFS | Mid-2018 |
| Completion of DFS | Q1 2019 |
| Decision to Mine | Q1 2019 |
| Target Production Commencement | 2021 |

Global Mineral Resource

In summary, Namdini was estimated as an Indicated Mineral Resource of 120 M tonnes grading 1.1 g/t Au for 4.3 Moz Au and an Inferred Mineral Resource of 84 M tonnes grading 1.2 g/t Au for 3.1 Moz Au at a 0.5 g/t Au cut off.

| Category | Weathering Profile | Tonnage (Mt) | Grade (g/t Au) | Contained Gold (Moz) |
|---|---|---|---|---|
| Indicated | Oxide | 3.92 | 1.1 | 0.14 |
| | Transition | 4.38 | 1.1 | 0.15 |
| | Fresh | 112.1 | 1.1 | 3.98 |
| Total Indicated Mineral Resource | | 120.4 | 1.1 | 4.27 |
| Inferred | Oxide | 0.18 | 0.8 | 0.005 |
| | Transition | 0.11 | 1.0 | 0.004 |
| | Fresh | 84.0 | 1.2 | 3.11 |
| Total Inferred Mineral Resource | | 84.3 | 1.2 | 3.12 |

Namdini Global Mineral Resource Estimate at 0.5 g/t cut off – September 2017

Estimation Methodology

MPR Geological Consultants Pty Ltd (“MPR”) estimated recoverable resources for Namdini using Multiple Indicator Kriging (“MIK”) with block support adjustment, a method that has been demonstrated to provide reliable estimates of recoverable open pit resources in gold deposits of diverse geological styles. The Mineral Resource was estimated using multiple indicator kriging using GS3M© software developed by FSS International Consultants (Australia).

Estimation was constrained within a mineralization envelope (wireframe) based on geological logging and grade thresholds. The three-main host lithologies are granite, metavolcanics and diorite. Where geological contacts were not clearly controlling the distribution of mineralization, a grade cut-off of approximately 0.1 g/t Au was used to construct Mineral Resource boundaries.

The domain trends north-northeast over 1.2 km and dips approximately 60º to the west with an average horizontal width of approximately 350 m. The Mineral Resource can reasonably be expected to provide appropriately reliable estimates of potential mining outcomes at the assumed selectivity, without application of additional mining dilution or mining recovery factors. Validation of the MIK model was undertaken visually and statistically.

Parent block dimensions of 12.5 mE by 25 mN by 5 mRL were used for estimation. All sample assays were composited to 2 m prior to estimation.

Classification

The Namdini Mineral Resource has been classified into the Indicated and Inferred categories, in accordance

with the 2012 Australasian Code for Reporting of Mineral Resources and Ore Reserves (JORC Code) and the CIM Definition Standards (CIM, 2014). A range of criteria were considered in determining this classification including geological and grade continuity, data quality and drill hole spacing.

The key classification criteria are described as follows:

Resource model blocks have been classified as Indicated or Inferred on the basis of search passes and a wire-frame outlining more closely drilled portions of the mineralization.
Blocks within the classification wire-frame informed by all search passes were classified as Indicated. Blocks outside the classification wire-frame and estimated by iteration 1 are classified as Indicated. All remaining blocks estimated by iterations 2 and 3 were assigned to the Inferred category.

The three progressively more relaxed search criteria used for MIK estimation are presented in Table 5. The search ellipsoids were aligned with the general mineralization orientation.

| Search | Radii (m) (x,y,z) | Minimum Data | Minimum Octants | Maximum Data |
|---|---|---|---|---|
| 1 | 65, 65, 15 | 16 | 4 | 48 |
| 2 | 65, 65, 15 | 16 | 4 | 48 |
| 3 | 97.5, 97.5, 22.5 | 8 | 2 | 48 |

Search criteria for Resource Classification.

- Geological continuity is understood with reasonable confidence. The classification reflects this level of confidence.
- Resource classification is also based on information and data provided from the Cardinal database. Descriptions of drilling techniques, survey, sampling, sample preparation, analytical techniques and database management/validation provided indicate to MPR that data collection and management is well within industry standards. The database represents an accurate record of the drilling undertaken at the project.
- A trial optimisation was run at a USD$1,500/oz gold price to define the base of Reasonable Prospects for Eventual Economic Extraction (“RPEEE”). All blocks outside this shell are unclassified.
- Drill hole location plots were used to ensure that local drill spacing conformed to the minimum expected for the various resource classification categories.

MPR considers the estimation technique and parameters appropriate for this style of mineralization.
The production target is based on 81% Indicated Mineral Resources and 19% Inferred Mineral Resources. There is a lower level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the production target will be realised.

Gold Price

The Study used a base-case gold price of US$1300/oz.
The gold price selected for the study was at the average prevailing market spot gold price. The price was also assessed as one that has been utilized across a number of studies presented by peers.

Mining and Metallurgical Methods and Parameters

Trial open pit optimisations were run in Whittle 4X© at a US$1,300/oz gold price to define the base of potentially economic material. Four cut back pits were then selected and full mine designs applied.

Mining of the Namdini project has been assumed to be medium-scale using conventional open pit mining equipment. The mining process will include drill and blast as well as conventional load and haul operations. There is expected to be a limited amount of free dig material with the majority of material assumed to require drilling and blasting.

Mining will be carried out using staged cut‑backs with four identified stages incorporated within the

LOM final pit. Except for the initial plant commissioning, Oxide ore will be stockpiled temporarily and blended into the process feed with the fresh ore. Waste rock will be stockpiled separately on the western side of the pit.

The metallurgical work carried out to date indicates that gold can be satisfactorily recovered from Namdini ore using conventional flotation and Carbon In Leach (CIL) cyanidation techniques. The work is considered sufficient to determine that the Namdini Mineral Resource represents a deposit with potential economic extraction.

Mining Factors

The in-situ deposit Mineral Resource Model is the basis for the mining model used for Life of Mine (LOM) planning and assessment reporting.

The Mineral resource model provided as the basis of the LOM planning assessment is the MIK resource model prepared by MPR. The model has cell dimensions of 12.5m (east) by 25m (north) by 5m (elevation).

Gold grades were supplied with the model as estimated proportional grades using the MIK estimation technique.

An estimated marginal cut‑off grade was established at 0.5g/t using an assumed long‑term gold price of US$1,300 /ounce.

Aggregate Gold royalties were assumed at 5% NSR (net smelter return).

Mining costs used for the mine schedule were US$ 3.26 /t mined, confirmed by in-country mining contractors.

Process plant recovery was estimated at 90% for oxide and 86% for fresh material from initial metallurgical test work.

For purposes of the baseline mining model, an input process cost for the 7.0 Mtpa option was estimated at US$12/t milled plus an additional US$1.5/t allowed for stockpile (s/p) reclaim – all tonnes are assumed to be on a dry basis.

Using the identified marginal Cut-off Grade, the proportion of ore per parcel and gold grade above the Cut-off Grade were included within the mining model to allow export of the parcelled (ore + waste) blocks to the pit optimiser for open pit optimisation.

The mining model has assumed that sufficient account for estimated ore loss and dilution incorporated into the resource model through the resource estimation technique. Bulk mining (minimal selectivity) was assumed with 600t excavators feeding 220t rigid body haul trucks.

A minimum mining width of 100m was assumed.

Mining dilution and recovery are addressed in the model method (MIK with variance adjustment) and the utilization of flitch mining.

Inferred Mineral Resources have been included for scoping study assessment within the LOM planning. No Ore Reserves are currently declared for the Namdini project. The proportion of Inferred Mineral Resource material within the first three identified mining stages account to some 19% of potential mill feed but increases beyond the first three stages.

Mining Infrastructure requirements were assumed to be provided by the selected mining contractor with the

mining performed on an outsourced basis.

Grade control will be based on sampling from reverse circulation drilling spaced at approximately 15mE by 10mN with samples taken at 1.5 metre intervals downhole.

All Grade Control sampling assays are assumed to be determined by fire assay on the mine site. Standard QAQC protocols will be applied which comprise of 1 in every 10 samples.

Minimal infrastructure is required for the selected mining method.

Geotechnical Parameters

The pit slopes were assessed from an initial geotechnical assessment by Golder with the oxide (upper material) requiring an estimated overall slope angle of 40º, whilst an overall slope angle of 45º was allowed for in the fresh rock. Grade control drilling will precede ore identification and ore mark‑out on a bench basis.

Mine Scheduling

The mine scheduling programme includes revenue and cost information to maximise NPV. The scheduling software assesses the value generated by each block to determine whether the block is fed directly to the plant, stockpiled or treated as waste. Further financial analysis to determine more realistic absolute financial indicators and sensitivity analysis are performed separately using the tonnes and grades extracted from the schedule.

The mine design of the Namdini Project consists of a series of nested conventional pit layouts with orebody access provided by a series of ramps. The orebody can be considered a layered sequence consisting of strongly oxidised, moderately oxidised, transition, fresh and fresh mineralized zones.

Mining will be of a conventional type shovel and dump truck operation.

High‑level mine production schedules were evaluated for the three scenarios considered (4.5, 7.0 and 9.5 Mtpa mill throughputs) using a starter pit with subsequent pushbacks to the target pit size.

The schedules allowed an initial ramp up for the process plant in each case before full process plant production was assumed. In order to gain maximum value from the 9.5 Mtpa option, an estimated total peak rock movement of some 30 Mtpa is required in year 7 of the schedule, whereas the 7.0 Mtpa option indicated a total peak required movement of some 17 Mtpa. The 4.5 Mtpa option saw a peak total required rock movement of some 15 Mtpa.

Mine Design Criteria

The mine design criteria were developed to allow for the development and assessment of designs to provide plant feed rates of 4.5, 7.0 and 9.5 Mtpa.

For this mining study, the maximum mining movement has allowed for a strip ratio of up to 2:1 in order that the initial optimisations are not ’mining-limited’.

For the conceptual pit design, two geotechnical domains namely Zone 1 – Slightly and Moderately Oxidized Weathering Domain and Zone 2 – Transitional and Fresh Weathering Domain, were used to define pit bench heights, berm widths and slope angles.

The indicative production schedules are as follows:

| KEY ESTIMATED PRODUCTION RESULTS | UNIT | 4.5 Mtpa | 7.0 Mtpa | 9.5 Mtpa |
|---|---|---|---|---|
| Average Annual Production – Gold | (oz / yr) | 159,000 | 211,000 | 333,000 |
| Life of Mine Production – Gold | (oz) | 3,524,000 | 3,506,000 | 3,521,000 |
| Average Mine Head Grade | g/t Au | 1.1 | | |
| Resource Mined at 0.5 g/t cut-off grade | Tonnes | 113,000,000 | | |
| Life of Mine Strip Ratio | W:O | 1.2 : 1 | | |
| Mine Life | years | 27 | 19 | 14 |

Mining Cost

The PEA assumes the mining contractor will bear the total mining capital cost under an outsourced mining arrangement with the costs recovered by the mining contractor on a cost per tonne mined basis.

Golder solicited mining costs from in-country mining contractors. The estimated base mining cost has applied an incremental cost with depth to account for increased haulage costs and the depth of mining increases in line with standard mining cost principles.

All costs have been determined on a US dollar basis.

Metallurgy

The comminution and metallurgical testwork has provided preliminary information about the physical characteristics and metallurgical response of the three Namdini lithologies.

The processing route for the Namdini ores would be crush, primary grind, sulphide flotation followed by regrind and CIL cyanidation of the flotation concentrate.

Oreway Mineral Consultants (OMC) has utilised the comminution results for comminution circuit selection and mill sizing. A primary crushing and SABC comminution circuit (open circuit SAG mill with recycle pebble crushing followed by closed circuit ball mill/hydro-cyclones) was selected by OMC based on the available comminution parameters.

A primary grind size of 80% passing 106 micron was utilised for the primary grind design of the PEA assessment.

A gravity concentration circuit has been incorporated given the presence of gravity recoverable gold (GRG).

The laboratory flotation testwork indicated fast sulphide flotation kinetics.

The flotation concentrate is reground and is subjected to pre-aeration before CIL.

Industry typical design parameters were assumed for the scoping study where testwork was not completed.

Detailed metallurgical testwork is continuing for the Namdini project under the direction of Cardinal.

An average estimated 86% recovery for the fresh ore was applied in the LOM plan and the pit optimisation process.

The process plant will be a conventional CIL with elution circuit, electrowinning and gold smelting to recover the gold from the loaded carbon to produce doré.

Gold is recovered using single-stage crushing, milling (SAG + ball), gravity circuit (Knelson Concentrator), flotation, concentrate regrind circuit and a CN/CIL circuit.

The metallurgical process is well-tested technology.

No deleterious elements were identified in the testwork that could affect the saleability or price of the gold doré produced.

Metallurgical testwork carried out to date indicates that the Namdini project can utilise a standard gold recovery process plant design with no innovative technology required.

Namdini will produce readily saleable gold doré which will be exported for refining.

Processing Costs

Capital costs were provided by Lycopodium who carried out a scoping level study for Cardinal Resources on the Namdini Project. Capital and operating costs were estimated for three process plant throughputs, namely 4.5, 7.0 and 9.5Mtpa ore feed.

Capital Costs are tabulated below:

| UNIT | 4.5 Mtpa | 7.0 Mtpa | 9.5 Mtpa |
|---|---|---|---|
| USD (M) | 275 | 349 | 426 |

Operating costs provided by Lycopodium were compiled from a variety of sources and compared against existing and planned operations elsewhere in Ghana.

Operating Costs are tabulated below:

| | 4.5 Mtpa (USD / t) | 7.0 Mtpa (USD / t) | 9.5 Mtpa (USD / t) |
|---|---|---|---|
| Processing | 11.6 | 10.6 | 10.1 |
| G & A | 1.9 | 1.4 | 1.2 |
| TOTAL | 13.5 | 12.0 | 11.3 |

Sustaining costs provided by Knight Piesold and Cardinal were compiled from a variety of sources and compared against existing and planned operations elsewhere in Ghana.

Sustaining Costs are tabulated below:

| UNIT | 4.5 Mtpa | 7.0 Mtpa | 9.5 Mtpa |
|---|---|---|---|
| USD (M) | 151 | 137 | 130 |

No deleterious elements are envisaged during the processing of the ore, an allowance of an additional $1.60/t processed were included during the initial processing years.

Pit Optimisations

Pit optimizations were completed using the Lerchs-Grossman (LG) algorithm in Whittle© to calculate the optimal pit at specified input parameters that were determined prior to the study. A wireframe pit shell for each gold price considered was the resultant output. One of these was selected as the base for the pit design.

Infrastructure

Lycopodium have completed a scoping level study covering all related aspects of the Infrastructure requirement including power, water, road access and waste management.

The site will be accessed by road from the West with a new, approximately 25 km, gravel road linking the site to the existing national road N10 between Pwalagu and Winkogo. The N10 provides good access to the major cities and ports in southern Ghana and no upgrades of the N10 will be undertaken. The site access road will follow a similar route to the proposed new power line for the existing substation north of Pwalagu.

Infrastructure will include the following dedicated elements:

- Unsealed road
- HV powerline
- Water supply line from the Volta River.

The site is located approximately 20km outside of Bolgatanga and 180km from Tamale. Serviced camp style accommodation will also be integrated in the proximity of the operation. A shuttle bus service will operate to and from site as required.

Cardinal Resources has sufficient area on its leases to cater for its planned land requirements.

This study was based on the assumption that a new approximately circa 30-kilometre-long power line will be constructed from the Northern Electricity Department Company (NEDCo) substation.

Water Supply

Water will be extracted from the White Volta River and pumped to the Namdini Site for process and other uses. The distance is estimated at 7km.

Potable water will be supplied via a containerised water treatment plant.

Site Facilities

An allowance was made for the cost of offices, stores, workshops, fuel and reagent stores, laboratory, medical facility, control rooms and other prefabricated or steel framed buildings and items of miscellaneous infrastructure necessary to support the operations.

Cut-off Parameters

A marginal cut‑off grade (COG) was estimated for gold using:

- a gross long-term gold price of USD$1,300 / ounce
- input processing costs of $13.7/t plus $1.5/t stockpile reclaim
- an estimated 86% metallurgical recovery

A marginal Cut-off Grade has been estimated at 0.5g/t Au per tonne.

The 0.5 g/t Au cut-off approximates an operational parameter that the Company believes to be applicable. This is in accordance with the guidelines of Reasonable Prospects for Eventual Economic Extraction (“RPEEE”) per the Canadian Institute of Mining, Metallurgy and Petroleum “CIM Definition Standards for Mineral Resources and Mineral Reserves” (CIM, 2014) and the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the JORC Code 2012).

Capital Costs

The mining establishment cost was provided by in-country mining contractors. The process plant and infrastructure costs were estimated by Lycopodium. The costs for the TSF were provided by Knight Piésold. The capital costs include owner’s project cost and contingency as calculated by Lycopodium.

The estimate base date is Q2 2017. The estimate is deemed to have an accuracy of ±40%.

Operating Cost

The process plant operating costs were estimated and compiled by Lycopodium with contributions from a number of sources including

- Reagent consumption based on testwork
- Crushing and grinding modelling by OMC
- Data from equipment vendors
- Lycopodium databases

Environmental

An initial environmental study was completed by NEMAS. This scoping study was conducted in early 2017 with the scoping report delivered to the Ghanaian authorities in June 2017.

The rock formations have a very low permeability and the mine is a net user of water for operational purposes. An acid base accounting study was conducted on the Namdini open pit mine’s ore and waste, determining the waste to be non-acid forming and the ore to be potentially acid forming. Process plant tailings will be stored in an approved storage facility.

Further detailed environmental study is presently underway.

Knight Piesold developed a conceptual layout and a preliminary cost estimate for the tailings storage facility (TSF) for the three throughput options. The TSF will be located to the south of the pit and the process plant and will have separate sections to accommodate both the floatation and CIL tailings.

An allowance was made in the initial capital cost and the sustaining capital cost estimates for the TSF.

Social

PFS Environmental study is progressed by NEMAS including active engagement of local and state regulatory bodies.

Cardinal Group has a good relationship with neighbouring stakeholders, including engagement with the local stakeholders. Granted mining leases cover all of the proposed mining and processing assets and there are no title claims pending.

Expatriate and skilled Ghanaians from outside the local community will be accommodated in a single status camp on site. An allowance for an accommodation camp to house up to 200 people has been made in the capital cost estimate.

The local workforce will be bussed from the neighbouring population centres.

Compensation agreements are to be negotiated for the proposed mining operation.

Audit or Reviews

The mining and processing and infrastructure components of the scoping study were independently reviewed.

The Namdini project was visited by the senior Golder geotechnical engineer in Ghana, with planned visits prior to future Ore Reserves declaration by the Competent Person for Ore Reserves.

Mr Glenn Turnbull, a Chartered member of The Australasian Institute of Mining and Metallurgy visited site in December 2017.

No material issues were identified by the reviewers.

Other

There are no known current impediments to the progression of the project or foreseen encumbrances to the granting of a licence to operate.

Continued discussions with the regulatory authorities and submission of the mine plan and closure plan will be submitted to the Ghanaian authorities during the course of the pre‑feasibility study.

ABOUT CARDINAL

Cardinal Resources Ltd. (ASX:CDV) (TSX:CDV) is a West African gold‐focused exploration and development Company which holds interests in tenements within Ghana, West Africa.

The Company is focused on the development of the Namdini Project through a resource expansion drilling programme and is now advancing the pre‐feasibility study supported by additional multi-disciplinary engineering activities.

Exploration programmes are also underway at the Company’s Bolgatanga (Northern Ghana) and Subranum (Southern Ghana) Projects.

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Competent and Qualified Person Statement
All production targets for the Namdini Gold Mine referred to in this report are underpinned by estimated Mineral Resources which were prepared by competent persons and qualified persons in accordance with the requirements of the JORC Code and National Instrument 43-101- Standards of Disclosure for Mineral Projects (“NI43-101”), respectively.

Metallurgical and process engineering information contained in this press release has been reviewed and approved by Marc LeVier, K. Marc LeVier & Associates, Inc., who is a ‘qualified person’ as defined by NI43-101. Mr. LeVier holds a Qualified Professional status from the Mining and Metallurgical

Society of America.

The information in this report that relates to Namdini Mineral Resources is based on information compiled and reviewed by Mr Nicholas Johnson, a Competent Person who is a Member of the Australian Institute of Geoscientists and a full-time employee of MPR Geological Consultants Pty Ltd. Mr Johnson has sufficient experience which is relevant to the style of mineralization and type of deposit under consideration and to the activity which he has undertaken to qualify as a Competent Person as defined in the JORC Code 2012 and is a qualified person for the purposes of NI43-101. Mr Johnson has no economic, financial or pecuniary interest in the company and consents to the inclusion in this report of the matters based on his information in the form and context in which it appears.

The information in this report that relates to Namdini Mineral Resources is based on information compiled and reviewed by Mr Richard Bray, a Competent Person who is a Registered Professional Geologist with the Australian Institute of Geoscientists and a full-time employee of Cardinal Resources Ltd. Mr Bray has sufficient experience which is relevant to the style of mineralization and type of deposit under consideration and to the activity which he has undertaken to qualify as a Competent Person as defined in the JORC Code 2012 and is a qualified person for the purposes of NI43-101. Mr. Bray is a full-time employee of Cardinal and holds equity securities in the Company. Mr. Bray has consented to the inclusion of the matters in this report based on the information in the form and context in which it appears.

The information in this report that relates to Namdini Mining studies is based on information compiled and reviewed by Mr Glenn Turnbull, a Competent Person who is a Chartered Professional Member of the Australasian Institute of Mining and Metallurgy and a full-time employee of Golder and Associates. Mr Turnbull has sufficient experience which is relevant to the style of mineralization and type of deposit under consideration and to the activity which he has undertaken to qualify as a Competent Person as defined in the JORC Code 2012 and is a qualified person for the purposes of NI43-101. Mr Turnbull has no economic, financial or pecuniary interest in the company and consents to the inclusion in this report of the matters based on his information in the form and context in which it appears.

Disclaimer
This ASX / TSX press release has been prepared by Cardinal Resources Ltd. (ABN: 56 147 325 620) ("Cardinal" or the "Company"). Neither the ASX nor the TSX, nor their regulation service providers accept responsibility for the adequacy or accuracy of this press release.

This press release contains summary information about Cardinal, its subsidiaries and their activities, which is current as at the date of this press release. The information in this press release is of a general nature and does not purport to be complete nor does it contain all the information which a prospective investor may require in evaluating a possible investment in Cardinal.

By its very nature, exploration for minerals is a high‐risk business and is not suitable for certain investors. Cardinal’s securities are speculative. Potential investors should consult their stockbroker or financial advisor. There are a number of risks, both specific to Cardinal and of a general nature which may affect the future operating and financial performance of Cardinal and the value of an investment in Cardinal including but not limited to economic conditions, stock market fluctuations, gold price movements, regional infrastructure constraints, timing of approvals from relevant authorities, regulatory risks, operational risks and reliance on key personnel and foreign currency fluctuations.

Except for statutory liability which cannot be excluded and subject to applicable law, each of Cardinal’s officers, employees and advisors expressly disclaim any responsibility for the accuracy or completeness of the material contained in this press release and excludes all liability whatsoever (including in negligence) for any loss or damage which may be suffered by any person as a consequence of any information in this Announcement or any error or omission here from. Except as required by applicable law, the Company is under no obligation to update any person regarding any inaccuracy, omission or change in information in this press release or any other information made available to a person nor any obligation to furnish the person with any further information. Recipients of this press release should make their own independent assessment and determination as to the Company’s prospects, its business, assets and liabilities as well as the matters covered in this press release.

Forward‐looking statements
Certain statements contained in this press release, including information as to the future financial or

operating performance of Cardinal and its projects may also include statements which are ‘forward‐looking statements’ that may include, amongst other things, statements regarding targets, estimates and assumptions in respect of mineral resources and anticipated grades and recovery rates, production and prices, recovery costs and results, capital expenditures and are or may be based on assumptions and estimates related to future technical, economic, market, political, social and other conditions. These ‘forward-looking statements’ are necessarily based upon a number of estimates and assumptions that, while considered reasonable by Cardinal, are inherently subject to significant technical, business, economic, competitive, political and social uncertainties and contingencies and involve known and unknown risks and uncertainties that could cause actual events or results to differ materially from estimated or anticipated events or results reflected in such forward‐looking statements.

Cardinal disclaims any intent or obligation to update publicly or release any revisions to any forward‐looking statements, whether as a result of new information, future events, circumstances or results or otherwise after today’s date or to reflect the occurrence of unanticipated events, other than required by the Corporations Act and ASX and TSX Listing Rules. The words ‘believe’, ‘expect’, ‘anticipate’, ‘indicate’, ‘contemplate’, ‘target’, ‘plan’, ‘intends’, ‘continue’, ‘budget’, ‘estimate’, ‘may’, ‘will’, ‘schedule’ and similar expressions identify forward‐looking statements.

All forward‐looking statements made in this press release are qualified by the foregoing cautionary statements. Investors are cautioned that forward‐looking statements are not guarantees of future performance and accordingly investors are cautioned not to put undue reliance on forward‐looking statements due to the inherent uncertainty therein.

APPENDIX 1

JORC CODE 2012 EDITION – TABLE 1

Section 1 – Sampling Technique and Data

| Criteria | JORC Code Explanation |
|---|---|
| Sampling techniques | Nature and quality of sampling (e.g. cut channels, random chips, c measurement tools appropriate to the minerals under investigation handheld XRF instruments, etc.). These examples should not be t sampling. |
| | Include reference to measures taken to ensure sample representiv measurement tools or systems used. |
| | Aspects of the determination of mineralisation that are Material to |
| | In cases where ‘industry standard’ work has been d ‘reverse circulation drilling was used to obtain 1 m samples produce a 30 g charge for fire assay’). In other cases, mor where there is coarse gold that has inherent sampling problems. U types (e.g. submarine nodules) may warrant disclosure of detailed |

| | |
|---|---|
| Drilling techniques | Drill type (e.g. core, reverse circulation, open‐hole hamme etc.) and details (e.g. core diameter, triple or standard tube, depth type, whether core is oriented and if so, by what method, etc.). |
| | Method of recording and assessing core and chip sample recover |
| Drill sample recovery | |
| | Measures taken to maximise sample recovery and ensure represe |
| | Whether a relationship exists between sample recovery and grade occurred due to preferential loss/gain of fine/coarse material. |
| | Whether core and chip samples have been geologically and geote support appropriate Mineral Resource estimation, mining studies a |
| Logging | |
| | Whether logging is qualitative or quantitative in nature. Core (or co |
| | The total length and percentage of the relevant intersections logge |

| | |
|---|---|
| | If core, whether cut or sawn and whether quarter, half or all core t |
| | If non-core, whether riffled, tube sampled, rotary split, etc. and wh |
| | For all sample types, the nature, quality and appropriateness of th |
| Sub-sampling techniques and sample preparation | |
| | Quality control procedures adopted for all sub-sampling stages to |
| | Measures taken to ensure that the sampling is representative of th instance results for field duplicate/second‐half sampling. |
| | Whether sample sizes are appropriate to the grain size of the mat |

| | |
|---|---|
| Quality of Assay data and laboratory tests | The nature, quality and appropriateness of the assaying and labor technique is considered partial or total.<br><br>For geophysical tools, spectrometers, handheld XRF instruments, the analysis including instrument make and model, reading times, derivation, etc.<br><br>Nature of quality control procedures adopted (e.g. standards, blan and whether acceptable levels of accuracy (i.e. lack of bias) and p |
| Verification of sampling and assaying | The verification of significant intersections by either independent o<br>The use of twinned holes.<br>Documentation of primary data, data entry procedures, data verifi electronic) protocols.<br>Discuss any adjustment to assay data. |
| Location of data points | Accuracy and quality of surveys used to locate drill holes (collar a mine workings and other locations used in Mineral Resource estim<br><br>Specification of the grid system used.<br><br>Quality and adequacy of topographic control. |
| Data spacing and distribution | Data spacing for reporting of Exploration Results.<br>Whether the data spacing and distribution is sufficient to establish continuity appropriate for the Mineral Resource and Ore Reserve applied.<br>Whether sample compositing has been applied. |
| Orientation of data in relation to geological structure | Whether the orientation of sampling achieves unbiased sampling which this is known, considering the deposit type.<br><br>If the relationship between the drilling orientation and the orientati considered to have introduced a sampling bias, this should be ass |

| | |
|---|---|
| Sample security | The measures taken to ensure sample security. |
| Audits or reviews | The results of any audits or reviews of sampling techniques and d |

Section 2 – Reporting of Exploration Results

(Criteria listed in section 1 will also apply to this section where relevant)

| Criteria | JORC Code Explanation |
|---|---|
| Mineral Tenement and Land Status | Type, name/reference number, location and ownersh parties including joint ventures, partnerships, overridi wilderness or national park and environmental setting |
| Exploration Done by Other Parties | The security of the tenure held at the time of reportin license to operate in the area.<br>Acknowledgment and appraisal of exploration by oth |
| Geology | Deposit type, geological setting and style of mineralis |
| Drill hole information | A summary of all information material to the understa the following information for all Material drill holes:<br>● Easting and northing of the drill hole collar<br>● Elevation or RL (Reduced Level – eleva<br>● Dip and azimuth of the hole<br>● Down hole length and interception depth<br>● Hole length<br>If the exclusion of this information is justified on the b exclusion does not detract from the understanding of explain why this is the case. |

| | |
|---|---|
| Data aggregation methods | In reporting Exploration Results, weighting averaging<br>truncations (e.g. cutting of high grades) and cut&#82<br>Where aggregated intercepts incorporate short lengt<br>results, the procedure used for such aggregation sho<br>aggregations should be shown in detail. |
| Relationship between mineralisation widths and intercept lengths | The assumptions used for any reporting of metal equ<br>These relationships are particularly important in the r<br>If the geometry of the mineralisation with respect to t<br>reported.<br>If it is not known and only the down hole lengths are<br>(e.g. ‘down hole length, true width not known& |
| Diagrams | Appropriate maps and sections (with scales) and tab<br>significant discovery being reported. These should in<br>locations and appropriate sectional views. |
| Balanced Reporting | Where comprehensive reporting of all Exploration Re<br>low and high grades and/or widths should be practice |
| Other substantive exploration data | Other exploration data, if meaningful and material, sh<br>geological observation; geophysical survey results; g<br>and method of treatment; metallurgical test results; b<br>characteristics; potential deleterious or contaminating |
| Further Work | The nature and scale of planned further work (e.g. te<br>– scale step – out drilling).<br>Diagrams clearly highlighting the areas of possible ex<br>and future drilling areas, provided this information is |

Section 3 – Estimation and Reporting of Mineral Resources

| Criteria | JORC Code Explanation |
|---|---|
| Database integrity | Measures taken to ensure that data has not been corrupted by, for exampl<br>between its initial collection and its use for Mineral Resource estimation pu |
| Site visits | Data validation procedures used.<br>Comment on any site visits undertaken by the Competent Person and the<br>If no site visits have been undertaken indicate why this is the case. |

| | |
|---|---|
| | Confidence in (or conversely, the uncertainty of) the geological interpretati |
| | Nature of the data used and of any assumptions made. |
| Geological interpretation | |
| | The effect, if any, of alternative interpretations on Mineral Resource estima |
| | The use of geology in guiding and controlling Mineral Resource estimation |
| | The factors affecting continuity both of grade and geology. |
| Dimensions | The extent and variability of the Mineral Resource expressed as length (alo width, and depth below surface to the upper and lower limits of the Mineral |

| | |
|---|---|
| | The nature and appropriateness of the estimation technique(s) applied and<br>treatment of extreme grade values, domaining, interpolation parameters ar<br>extrapolation from data points. If a computer assisted estimation method w<br>computer software and parameters used. |
| | The availability of check estimates, previous estimates and/or mine produc<br>Mineral Resource estimate takes appropriate account of such data. |
| Estimation and modelling techniques | The assumptions made regarding recovery of by-products.<br>Estimation of deleterious elements or other non-grade variables of econom<br>mine drainage characterisation). |
| | In the case of block model interpolation, the block size in relation to the av<br>search employed. |
| | Any assumptions behind modelling of selective mining units.<br>Any assumptions about correlation between variables.<br>Description of how the geological interpretation was used to control the res |
| | Discussion of basis for using or not using grade cutting or capping. |
| | The process of validation, the checking process used, the comparison of m<br>use of reconciliation data if available. |
| Moisture | Whether the tonnages are estimated on a dry basis or with natural moistur<br>determination of the moisture content. |

| | |
|---|---|
| Cut-off parameters | The basis of the adopted cut-off grade(s) or quality parameters applied. |
| Mining factors or assumptions | Assumptions made regarding possible mining methods, minimum mining d applicable, external) mining dilution. It is always necessary as part of the p prospects for eventual economic extraction to consider potential mining me regarding mining methods and parameters when estimating Mineral Resou Where this is the case, this should be reported with an explanation of the b made. |
| Metallurgical factors or assumptions | The basis for assumptions or predictions regarding metallurgical amenabili of the process of determining reasonable prospects for eventual economic metallurgical methods, but the assumptions regarding metallurgical treatm made when reporting Mineral Resources may not always be rigorous. Whe reported with an explanation of the basis of the metallurgical assumptions |
| Environmental factors or assumptions | Assumptions made regarding possible waste and process residue disposa part of the process of determining reasonable prospects for eventual econ potential environmental impacts of the mining and processing operation. W determination of potential environmental impacts, particularly for a greenfie well advanced, the status of early consideration of these potential environm Where these aspects have not been considered this should be reported wi environmental assumptions made. |
| Bulk density | Whether assumed or determined. If assumed, the basis for the assumption used, whether wet or dry, the frequency of the measurements, the nature, samples.<br><br>The bulk density for bulk material must have been measured by methods t spaces (vugs, porosity, etc), moisture and differences between rock and al<br><br>Discuss assumptions for bulk density estimates used in the evaluation proc |

| | |
|---|---|
| | The basis for the classification of the Mineral Resources into varying confi |
| Classification | |
| | Whether appropriate account has been taken of all relevant factors (ie., rel estimations, reliability of input data, confidence in continuity of geology and and distribution of the data). |
| | Whether the result appropriately reflects the Competent Person’s v |
| Audits or reviews | The results of any audits or reviews of Mineral Resource estimates. |
| | Where appropriate a statement of the relative accuracy and confidence lev estimate using an approach or procedure deemed appropriate by the Com application of statistical or geostatistical procedures to quantify the relative stated confidence limits, or, if such an approach is not deemed appropriate factors that could affect the relative accuracy and confidence of the estima |
| Discussion of relative accuracy/ confidence | |
| | The statement should specify whether it relates to global or local estimates tonnages, which should be relevant to technical and economic evaluation. assumptions made and the procedures used. |
| | These statements of relative accuracy and confidence of the estimate shou data, where available. |