

## **ASX Announcement**



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30 June 2015

# Positive Underground Scoping Study Provides Confidence to Move to Feasibility at Bibiani

Resolute Mining (ASX:RSG, "Resolute" or the "Company") is pleased to announce positive results from its first pass Underground Scoping Study ("Study") at its Bibiani gold project ("Bibiani") in Ghana and its decision to commence and complete a Feasibility Study at the project in 2016.

The results of the Study has delivered an underground mining inventory of 4.3Mt @ 4.2g/t Au at a 3.25g/t Au cut off for 574,000 ounces, close to the existing underground decline and level development requiring minimal development capital expenditure. The current underground development estimate stands at ~US\$15M and the plant and infrastructure upgrades at ~US\$15M.

#### **Highlights**

- Scoping Study indicates a positive gold project with low (~US\$30M) start-up capital risk and a short payback.
- A 4.3Mt @ 4.2g/t Au for 574,000 ounces mining inventory derived from an Indicated Resource of 11.2Mt @ 3.5g/t Au, for a 5.5 year mine life.
- 2015 Resource model sees a 60% increase in Indicated Resource ounces and a 12% increase in overall ounces compared to prior 2012 model.
- Further drilling expected to upgrade an Inferred Resource of 4.5Mt @ 4.1g/t
   Au.
- Potential to increase modelled 750,000 tonne per annum throughput along the extensive strike zone outlined, leading to the development of multiple adjacent lodes.
- Components of the Feasibility Study have commenced including a geotechnical evaluation to support mining methodology, process plant engineering studies and a metallurgical assessment.
- Longer term, drilling has only tested to the 13 Level, with large areas of potentially economic mineralisation at depth and along strike.

**Resolute Mining Limited** 

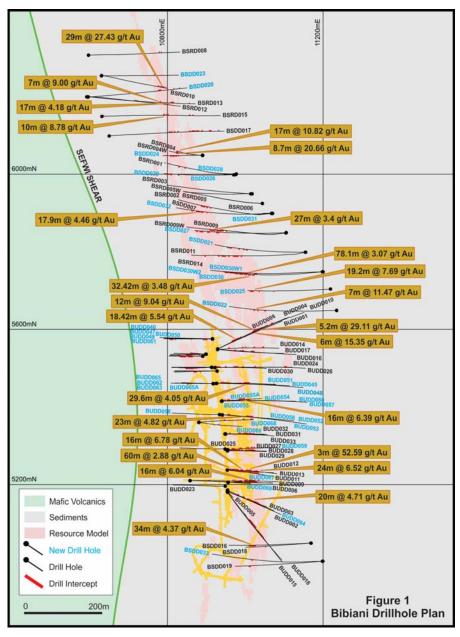
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#### **Background to Revised Resource Model**

Resolute completed 26,665m of underground and surface diamond drilling at Bibiani with the aim of enhancing the existing 1.7Moz Resource announced on 15 August 2014. The underground segment of this campaign was focused on identifying a consistent high grade zone within the Central Lode on levels 11 to 13 (375m vertical) over a strike length of 500m between 5000 and 5500N. Surface drilling that was conducted at the same time had success concentrating on areas directly north of the modern underground workings between 5700 and 6250N (see Figure 1).



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Mineralisation and grade shell wireframes were reinterpreted using the new drilling results to better reflect the geology of the deposit and used to update to a new resource model. This 2015 resource model (see Table 1) resulted in a 60% increase in Indicated Resource ounces and a 12% increase in overall ounces compared to the prior 2012 Coffey Model.

Table 1: 2015 Bibiani Resource Model Update

	Classification	Tonnes	Grade	Metal
		Mt	g/t Au	MOz Au
Resolute Model	Indicated	11.2 Mt	3.5 g/t	1.3 Moz
2015	Inferred	4.5 Mt	4.1 g/t	0.6 Moz
	Total	15.7 Mt	3.7 g/t	1.9 Moz
	Indicated	7.6 Mt	3.4 g/t	0.8 Moz
Coffey Model 2012	Inferred	7.7 Mt	3.5 g/t	0.9 Moz
2012	Total	15.3 Mt	3.4 g/t	1.7 Moz

Resolute Chief Executive Officer, Peter Sullivan said "The successful drilling campaign has translated into a very positive outlook for Bibiani as we move into the Feasibility Study. We are very optimistic it will point to a low capital start up, quick payback project with long life potential."

#### Scoping Study<sup>1</sup>

The new resource block model was provided to Snowden Mining industry Consultants ("Snowden") to complete an independent Underground Scoping Study, with the aim of outlining a mineable inventory that was accessible in the early phases of any proposed underground development. The Study has delivered an underground mining inventory of 4.3Mt @ 4.2g/t Au at a 3.25g/t Au cut off for 574,000 ounces, close to the existing underground decline and level development requiring minimal development capital expenditure.

Other key results from the Study that support a redevelopment of the Bibiani underground mine include:

- Observed stable underground geotechnical conditions which support long hole stoping mining methods
- An extensive orebody strike length with potential for further economic ore zones likely as project development continues

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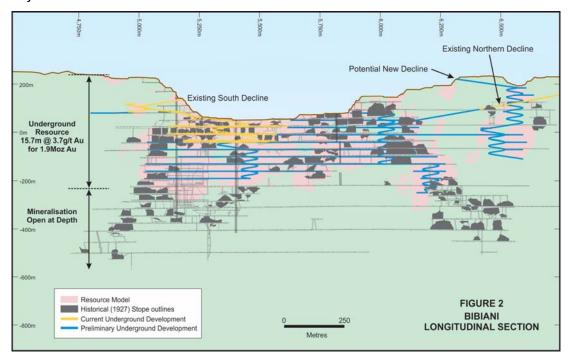
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- Existing level development available on 7, 8 and 9 level provide early access at low capital cost to potential stoping blocks while evaluation work and mine development continues into new areas
- An established operating site with a processing plant and associated facilities including grid connected power reducing any significant capital costs

Additionally, the Study highlighted an opportunity to expand underground access in the near term within the extensive strike zone available. The 60% complete Northern Decline provides a second entry point to the mine as well as access to deeper parts of the nearby satellite pits for any further underground targets – refer to Figure 2. The Company believes redevelopment of the Northern Decline would allow the mine production rate to increase through the advance of multiple adjacent ore lodes.



<sup>&</sup>lt;sup>1</sup> The Bibiani Gold Deposit Scoping Study is preliminary in nature and based on low accuracy level technical assessments, and is insufficient to support Ore Reserve estimations or to provide assurance of an economic development case at this stage; or to provide certainty that the conclusions of the Scoping Study will be realised.

#### **Conclusions and Recommendations**

With minimal start-up capital required - underground development estimate ~US\$15M, plant and infrastructure upgrades ~US\$15M - the Study has provided the Company with strong encouragement to continue its evaluation of the project and to advance the Feasibility Study work programs. Aspects of the feasibility work are already underway and include an underground geotechnical evaluation, process plant engineering studies and a metallurgical assessment. This Feasibility Study remains on track to be completed by mid-2016.

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Additionally, a range of opportunities and alternatives to further optimise Bibiani and enhance the financial performance have been identified, which include further resource upgrades and increasing the production rate. A number of value add scenarios will be assessed over the next 12 months that will be reported as results are returned. This includes a second phase drilling program in 2015 to infill and upgrade the 4.5Mt @ 4.1g/t Au (0.6Moz) Inferred Resource delineated within the mining inventory area.

PETER SULLIVAN

Chief Executive Officer

#### **About Resolute:**

Resolute is an unhedged gold miner with two operating mines in Africa and Australia. The Company is one of the largest gold producers by volume listed on the ASX with FY15 guidance of 315,000 ounces of gold production at a cash cost of \$890/oz. Resolute's flagship Syama project in Mali is on track for an increase in production to 270,000oz of gold a year following the recent addition of the oxide circuit to the processing plant. At its Ravenswood mine in Queensland Resolute is investigating a number of opportunities to add value by increasing gold production and lowering operating costs. In Ghana, the Company is now the owner and operator of the advanced Bibiani gold project where work is being undertaken on an underground feasibility study including a 25,000m drill program. The Company controls an extensive footprint along the highly prospective Syama Shear and Greenstone Belts in Mali and Cote d'Ivoire. Resolute has also identified a number of highly promising exploration targets at its Ravenswood operations and holds a number of exploration projects in Tanzania surrounding its now completed Golden Pride mine.

#### **Competent Persons Statement**

The information in this report that relates to the Exploration Results, Mineral Resources and Ore Reserves is based on information compiled by Mr Richard Bray who is a Registered Professional Geologist with the Australian Institute of Geoscientists and Mr Andrew Goode, a member of The Australasian Institute of Mining and Metallurgy. Mr Richard Bray and Mr Andrew Goode both have more than 5 years' experience relevant to the styles of mineralisation and type of deposit under consideration and to the activity which they are undertaking to qualify as a Competent Person, as defined in the 2012 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". Mr Richard Bray and Mr Andrew Goode are full time employees of Resolute Mining Limited Group and each hold equity securities in the Company. They have consented to the inclusion of the matters in this report based on their information in the form and context in which it appears.

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#### **BIBIANI GOLD MINE GHANA**

## **JORC Code, 2012 Edition - Table 1**

#### **Section 1 Sampling Techniques and Data**

Criteria	JORC Code explanation	Commentary
Sampling techniques	<ul> <li>Nature and quality of sampling (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc.). These examples should not be taken as limiting the broad meaning of sampling.</li> <li>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</li> <li>Aspects of the determination of mineralisation that are Material to the Public Report.</li> <li>In cases where 'industry standard' work has been done this would be relatively simple (e.g. 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (e.g. submarine nodules) may warrant disclosure of detailed information.</li> </ul>	Recent data (Mensin Gold 2014) is collected from reverse circulation (RC) and diamond core (DD) drill holes. Previous data (Noble Mineral Resources Limited 2011-2012) was collected from RC and DD drill holes, and historic data (1994-2007) from RC, DD and underground channel sampling (CHAN).  During the period of prior owners the RC, DD and CHAN drilling and sample collection is assumed to have been completed to industry standards at that time. The Bibiani mine has been operating since the early 1920's and limited sampling technique data has been recorded by previous owners over periods of its history. During 2010-2012, Noble Mineral Resources Ltd sampled RC intervals as four metre composites which were subsequently resampled at one metre intervals where required, while diamond core was cut in half and sampled on variable interval lengths.  Mensin Gold (2014) have conducted reverse circulation (precollars only) and diamond drilling since September 2014. For RC samples each 1m interval is riffle split to obtain a 2-4kg sample, which is sent to the laboratory for pulverisation to produce a 30g charge for analysis. Diamond core is sampled on one metre intervals, defined by geologists to ensure the interval does not cross geological contacts. Core is cut into half to provide a 2-4kg sample which is sent to the laboratory for crushing, splitting and pulverising to 85% passing 75 microns, to provide a 30g charge for analysis. Sampling and sample preparation protocols for Mensin Gold drilling are industry standard and are deemed appropriate by the Competent Person. QAQC samples are included with all sample batches.
Drilling techniques	Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc.) and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc.).	The Bibiani Main Zone deposit was modelled by Coffey Mining Pty Ltd using a subset of regional data comprising of 621 DD holes (244 Underground, 377 Surface), 724 RC holes and 244 Underground CHAN sampling runs.  Core type and size has been recorded for some historic holes, but many holes do not have this data recorded.  Mensin Gold completed 109 holes for 26,665 metres by RC (1,356m) and diamond drilling methods (25,309m) between September 2014 and February 2015. Core type and core size has been included in the drilling database and comprises PQ, HQ and NQ2 core sizes.
Drill sample recovery	<ul> <li>Method of recording and assessing core and chip sample recoveries and results assessed.</li> <li>Measures taken to maximise sample recovery and ensure representative nature of the samples.</li> <li>Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.</li> </ul>	In the historical data, sample recovery was not reported and it is unknown if this data was collected.  Where stopes or voids have been intersected, this was noted in the drilling log. Any additional measures taken to ensure samples are representative has not been documented in company records.  Any historical relationship between sample recovery and grade was not identified in company records.  Mensin Gold (2014) has recorded diamond core and RC recovery in the database. Diamond core recovery is compromised in areas immediately adjacent to old underground workings and separate void intervals are identified in the database where possible from driller records. Void intervals are allocated zero Au grade. During logging operations diamond core is assembled into continuous runs for orientation work allowing down hole depths and sample recovery to be determined.
Logging	Whether core and chip samples have been geologically and	Logging records lithology, alteration and mineralisation details for RC, DD holes and underground channel samples.



	geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.  • Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.  • The total length and percentage of the relevant intersections logged.	From 2014 Mensin Gold has recorded structural and geotechnical rock mass features for diamond core. Drill core is photographed in both dry and wet form.  Diamond core and RC chips are digitally logged, then validated and imported into the drill hole database.  Holes were logged in their entirety (100%).
Sub-sampling techniques and sample preparation	<ul> <li>If core, whether cut or sawn and whether quarter, half or all core taken.</li> <li>If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.</li> <li>For all sample types, the nature, quality and appropriateness of the sample preparation technique.</li> <li>Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.</li> <li>Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.</li> <li>Whether sample sizes are appropriate to the grain size of the material being sampled.</li> </ul>	Historic RC samples were split using a riffle (dry) to obtain a 2-4kg sample. Sample moisture content was not recorded. More recent grade control RC samples were sampled wet and dry where identified, otherwise assumed to be dry. All samples were riffle split unless recorded otherwise. Spear sampling was used in some cases for wet samples. Underground channel samples are assumed to have been taken from walls and faces using industry standard methods. RC intervals are riffle split (dry) to obtain a 2-4kg sample, which are sent to the laboratory for pulverising.  Diamond core was sampled at one metre intervals and cut in half to obtain a 2-4kg sample which is sent to the laboratory for crushing, splitting, pulverising and assaying.  The sampling techniques for RC, DD and underground channel samples appear appropriate. Where they are unknown, best practice was assumed. Historic sample intervals were commonly 5 or 10 feet, (stored as 1.5 or 3 meters in the current database). Recent RC drilling has been sampled using 4 metre composites, and then resampled at one metre intervals as required.  Analysis of sample sizes appeared to be appropriate.  Best practice was assumed at the time of historic RC, DD and underground channel sampling.  Sampling, sample preparation and quality control protocols are industry standard and all attempts are made to ensure an unbiased representative sample is collected. The methods applied in this process are deemed appropriate by the Competent Person.
Quality of assay data and laboratory tests	<ul> <li>The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.</li> <li>For geophysical tools, spectrometers, handheld XRF instruments, etc., the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.</li> <li>Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.</li> </ul>	RC and DD samples were assayed for gold by Intertek Tarkwa FA25/AAS method which is a 25g fire assay fusion with AAS instrument finish. This analytical method is appropriate for the style of mineralisation.  Methods for historic RC and DD holes included fire assay and AAS finish. During 2010-2013 regional and grade control RC drilling used a combination of bulk leach with AAS finish or fire assay with AAS finish. These methods appear suitable for determining gold concentrations of this type.  Noble Mineral Resources samples were submitted to Intertek, ALS Ghana and Performance Laboratories (Ghana) Ltd for assay analysis. Historically samples have been analysed by Analabs, SGS, and onsite laboratory (Performance Laboratories).  No geophysical tools were used to determine any elemental concentrations.  Quality control (QC) procedures included the use of certified reference standards and blanks inserted at a rate of one in twenty samples. Field duplicates are taken for RC and diamond core at the rate of one in twenty.  Umpire pulp analysis of 2-5% of pulps is performed by a second laboratory at the completion of a drill program to verify the results from the primary laboratory.  Laboratory quality control data including laboratory standards, blanks, duplicates, repeats and grind size results are also captured into the digital database and analysed for accuracy and precision.  Analysis of the QC sample assay results indicates that an acceptable level of accuracy and precision has been achieved.



		Maxwell GeoServices completed a QAQC audit for Coffey Mining and Noble Mineral Resources in Nov 2011 and determined historic sampling and laboratory practises used were of industry standard.  Coffey Mining Pty Ltd reviewed the available QAQC reports in 2012 and concurred with the conclusions and recommendations of Maxwells. Coffey Mining notes that the positive and negative assay bias that was calculated by Maxwell GeoServices included data with mislabelled CRM. Coffey Mining recommended that bias be calculated after eliminating those results which can reasonably be attributed to mislabelled CRM.  Coffey Mining also concluded that while the available QAQC data demonstrates acceptable levels of assay precision and accuracy, this was considered only marginally acceptable and considerable room for improvement existed.
Verification of sampling and assaying	<ul> <li>The verification of significant intersections by either independent or alternative company personnel.</li> <li>The use of twinned holes.</li> <li>Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.</li> <li>Discuss any adjustment to assay data.</li> </ul>	Verification of significant intersections was completed by company personnel and Coffey Mining personnel.  No drill holes within the resource were twinned.  Drill holes were logged onto paper templates, validated and then entered into a relational SQL 2008 database using DataShed data management software (Maxwell GeoServices). The data management software has a variety of verification protocols which are used to validate the data entry. The DataShed drill hole database was backed up on a daily basis to the head office server.  Assay result files were reported by the laboratory in CSV format or hardcopy and are imported into the SQL database without adjustment or modification.
Location of data points	<ul> <li>Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.</li> <li>Specification of the grid system used.</li> <li>Quality and adequacy of topographic control.</li> </ul>	Collar coordinates are surveyed in UTM (WGS84) by registered mine surveyors using electronic survey equipment.  Down hole surveys are collected every 30-50m using Reflex single shot and multi shot instruments.  Location coordinates and azimuth bearings are reported in UTM WGS84 Zone 30 North.  Bibiani Mine Grid is a locally established grid based on mining operations and is the principal grid system used on the site.
Data spacing and distribution	<ul> <li>Data spacing for reporting of Exploration Results.</li> <li>Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.</li> <li>Whether sample compositing has been applied.</li> </ul>	Drill hole spacing was sufficient to demonstrate geological and grade continuity appropriate for the Mineral Resource and the classifications applied under the JORC Code.  The appropriateness of the drill spacing was reviewed earlier by the Coffey technical team in 2012 and more recently by the Competent Person.  RC and diamond samples approximated 1m intervals.
Orientation of data in relation to geological structure	<ul> <li>Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.</li> <li>If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.</li> </ul>	Holes are drilled predominantly perpendicular to mineralised domains where possible.  No orientation based sampling bias has been identified in the data.
Sample security	The measures taken to ensure sample security.	Sample Chain of Custody is managed by Bibiani Project personnel. RC and diamond samples were collected from the drill location and stored on site before being securely dispatched to the commercial laboratory by specialised transport.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	An external audit of sampling procedures was conducted by Maxwell GeoServices and external consultants Coffey Mining indicated sampling protocols remain within industry standards.



## **Section 2 Reporting of Exploration Results**

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	<ul> <li>Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.</li> <li>The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.</li> </ul>	Drilling was conducted within the Ghanaian Mining Concession Permit of Bibiani which covers the current mining leases of the Bibiani Project.  Resolute Mining Limited has a 90% interest in the Bibiani Project through its subsidiary company Mensin Gold Bibiani Limited and the Exploitation Permit on which it is based. The Ghana Government holds a free carried 10% interest in Mensin Gold Bibiani Ltd (MGBL).  The Bibiani Mine concession is located approximately 6° 27' latitude north and 2° 17' longitude west in the Western Region of Ghana. The Bibiani mineral concessions lie approximately 80 kilometres south west of the Ashanti capital, Kumasi. The principal access to the mine is from the east, along the Kumasi – Bibiani – Sefwi Bekwi Highway. Ghana mining law provides that all mineral resources are administered by the Minerals Commission of Ghana.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	Commercial gold production commenced at Bibiani in the early 1900s and was suspended in 1915. In 1927 mining activities recommenced as the mine was developed and operated by foreign investors until it was nationalized in 1958. Post nationalisation, the mine was operated by SGMC (State Gold Mining Corporation) until it was closed in 1973 following the depletion of economic reserves.  During the SGMC period, reserves within the existing infrastructure were depleted and the old workings were reworked to recover pillars and remnant lower grade material (probably plus 6g/t) that was below the pay limit applied to the deposit prior to nationalisation.  Reports have suggested that during the first 65 years of production a total of 7.8 million tonnes from underground mining and 0.5million tonnes from surface operations were milled, producing over 2 million ounces of gold at an average recovered grade of approximately 9.5 g/t Au.  In the late-1980s, Glamco and International Gold Resources ("IGR") gained rights to the old Bibiani mine and initiated tailings reclamation and surface exploration, which activities led to the delineation of an open pit resource and a positive feasibility study.  Ashanti Goldfields purchased Bibiani from IGR in the mid-1990s for US\$ 130 million, financed an additional US\$ 85 million to capitalize the operation, and redeveloped the mine as an open pit operation with a modern processing plant. Ashanti Goldfields (now AngloGold Ashanti ("AGA")produced approximately 1.8 million ounces of gold from the main and satellite pits (after main pit production was hampered by a slope failure in 2004) and tailings retreatment, bringing total Bibiani production since inception to almost four million ounces.  Central African Gold plc (CAG) purchased Bibiani, for a cash consideration of US\$ 40 million. Subsequent to acquisition, CAG expended a further US\$ 51 million of capital on the mine, nearly all of which was used to accelerate underground access and to purchase a modern underground mining fleet. Despite d







Geology	Deposit type, geological setting and style of mineralisation.	The license area is underlain by metasedimentary rocks of the Lower Birimian in the eastern parts and by intercalated metasedimentary and metavolcanic rocks of the Upper Birimian in the western part of the license. Granites occur in the south-western corner of the license. The Lower Birimian sediments consist mainly of phyllites with intercalated greywackes and minor tuffs, while the Upper Birimian rocks consist of basalt to rhyolites flows with intercalated tuffs and minor phyllites and chert horizons. Diorite intrusives are found within the Upper Birimian metavolcanic rocks.  In the southern part of the license the rocks strike about 020° to 030° and dip steeply to the southeast. Further to the north the strike changes to between 040° and 050°.  Previous mapping identified several cross faults that offset the stratigraphy however there is no clear evidence of a relationship between these faults and the gold mineralisation. The Bibiani ore body trend continues north to the Pamunu River approximately two kilometres from the Bibiani Mine. A parallel splay off the Bibiani trend continues obliquely to the Bibiani North deposit one kilometre to the north of the Bibiani Mining Lease.
Drill hole Information	<ul> <li>A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:         <ul> <li>easting and northing of the drill hole collar</li> <li>elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar</li> <li>dip and azimuth of the hole</li> <li>down hole length and interception depth</li> <li>Whole length.</li> </ul> </li> <li>If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.</li> </ul>	All information including easting, northing, elevation, dip, azimuth, coordinate system, drill hole length, interval length and depth are measured and recorded in UTM Zone 30N WGS84.  Accuracy of the survey measurements is considered to meet acceptable industry standards.  Information provided for the Exploration drillhole results includes:  1. Easting, Northing and RL of the drill hole collars are measured and recorded in UTM Zone 30N (WGS84).  2. Dip is the inclination of the drill hole from horizontal. For example a drill hole drilled at -60° is 60° from the horizontal.  3. Down hole length is the distance down the inclination of the hole and is measured as the distance from the horizontal to end of hole.  4. Intercept depth is the distance from the start of the hole down the inclination of the hole to the depth of interest, assayed interval of interest or start of reported significant intercept.
Data aggregation methods	<ul> <li>In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.</li> <li>Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.</li> <li>The assumptions used for any reporting of metal equivalent values should be clearly stated.</li> </ul>	Significant intercepts are calculated using a lower cutoff value of Au=1.0 g/t.  No top cuts have been used.  Internal waste up to a maximum of 3m consecutive internal dilution can be included within the intercept.  Intercepts >=3m and with 'grade x width' > 10 gram metres are reported.  Historic mining voids or backfill have been included within intercepts but grades have been set at Au=0.0g/t. Void intervals up to 7.1m downhole.  Metal equivalent reporting was not used.
Relationship between mineralisation widths and intercept lengths	<ul> <li>These relationships are particularly important in the reporting of Exploration Results.</li> <li>If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.</li> <li>If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').</li> </ul>	The mineralisation is steeply east dipping at approximately 70° from the horizontal, although there are examples with subvertical and west dipping orientations. Drilling sections are designed to intersect the main mineralisation orthogonal to strike and dip.  Surface drill hole azimuths were planned at mine grid 090° at a general inclination of -65° west to intersect as close to perpendicular to the ore zone as possible. In general, true widths may be 50-90% of the downhole length.  Some underground drillholes have been drilled as fans due to limited access.
Diagrams	Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should	Refer to the maps and sections provided with this report.



	include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.	
Balanced reporting	Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.	No reporting of drill holes accompanies this report.
	Other exploration data, if meaningful and material, should be reported including (but not limited to):	No geophysical and geochemical data are reported in this release as they are not deemed relevant to the release.
Other substantive exploration data	geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.	All samples are measured for bulk density which has a mean value of 2.77 g/cm³ and varies between 2.30 and 3.00 g/cm³.
Further work	<ul> <li>The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).</li> <li>Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.</li> </ul>	Mensin Gold Bibiani Limited is continuing with an evaluation drilling program assessing the potential for an underground project using a combination of surface and underground drilling.



#### **Section 3 Estimation and Reporting of Mineral Resources**

Criteria	JORC Code explanation	Commentary
	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Data have been compiled into a relational SQL database. The setup of this database precludes the loading of data which do not meet the required validation protocols. The data was managed using DataShed <sup>TM</sup> drill hole management software (Maxwell Geoservices) using SQL database techniques. Validation checks are conducted using SQL and DataShed relational database standards.
	Data validation procedures used.	The resource estimation was based on the available exploration and grade control drill hole database which was compiled by Noble. The database has been reviewed and validated by Coffey Mining prior to commencing the resource estimation studies. Extensive data validation was also undertaken by Mensin Gold personnel.
		Data included samples from RC and diamond drilling which were included in the modelling process. All available drill hole data has been utilised. The database contained underground channel sampling from the Main Pit area which was excluded from the resource estimation studies. The database was validated and checks made to the database prior to use included:
Database integrity		Check for overlapping intervals.
		Downhole surveys at 0m depth.
		Consistency of depths between different data tables.
		Check gaps in the data.
		Replacing less than detection samples with half detection.
		Replacing intervals with no sample with -999.
		Replacing intervals with assays not yet received with -999.
		There are no significant issues identified with the drillhole data.
	Comment on any site visits undertaken by the Competent	The Competent Persons have conducted numerous site visits to the Bibiani Project in Ghana.
Site visits	Person and the outcome of those visits.  If no site visits have been undertaken indicate why this is the case.	All aspects of drilling, sampling and resource modelling were considered by the Competent Persons to be of industry standard.
	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The Bibiani ore body is a lode type deposit similar to deposits in the Konongo - Axim belt which hosts the Obuasi ore body. The ore body is located in a shear zone within Lower Birimian sediments close to the eastern contact with Upper Birimian rocks. The shear zone is filled with quartz, either as massive veins or as quartz stockworks. In the widest parts of the ore
	Nature of the data used and of any assumptions made.	body two and locally three quartz reefs can be identified. Two highly graphitic fault zones, historically referred to as pug seams or fissures, are associated with the major shear zone on the footwall and hanging wall. The ore body generally dips eastward at 60°-80°, crossing the regional structure at a low angle. The rocks around the Bibiani deposit have been
Geological interpretation	The effect, if any, of alternative interpretations on Mineral Resource estimation.	structurally interpreted as an elongate, isoclinally folded roof pendant within granitic batholiths. In the central part of the mine the strike of the ore body is 300- 350, which changes to around 020 in the northern extension of the mine. The strike of the bedding cuts across the strike of the ore body at a shallow angle. Historically the ore body was divided into a
	The use of geology in guiding and controlling Mineral Resource estimation.	northern and southern part, located north and south of the Central Shaft which lies on section line 5,400N (mine grid). In the open pit the ore body is continuous at lower cut-off grades. The South ore body, which occurs on the hanging wall of the West Fissure is about 180 meters long and consists of a composite vein of quartz and mineralised country rock dipping 60°-
	The factors affecting continuity both of grade and geology.	70° to the east. The North ore body, consists of the continuation of the West Reef and the East and Central reefs, which are poorly defined to the south. The latter reefs consist of more massive laminated smokey quartz with phyllite partings. Milky white quartz is also present, but this type is generally barren. The North ore body has been mapped as 20-40 meters



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		wide near surface, widening substantially at depth. On 4 and 5 Level (100-120mRL), horizontal widths exceed 100m. The dip is generally near vertical at surface, but the eastern boundary flattens moderately at depth to less than 65° at around 150mRL. The two or three reefs merge between 400-500 meters north of Central Shaft. Further to the north the ore thins and continues as one near vertical reef 15-25 meters wide. Even further to the north the mineralisation appears as two thin parallel reefs each generally less than 10 metres wide. At Big Mug the ore body is in an overturned orientation. Intrusive porphyry dykes occur in the hanging wall and to a lesser extent in the footwall straddling the main shear zone. They can transgress into the ore body, where they become strongly altered and mineralised. At around 400 meters to the north of the old Central Shaft the porphyry body bends off to the north-east.
		The strike length of the delineated mineable area extends up to 2000 meters, although there are two short zones, where the ore body is too thin for economic extraction. The total strike length of the Bibiani mineralised trend is around 4,000 meters. Two parallel trends occur about 600 meters and 1,200 meters to the east of the main trend. They start around 500 meters north of Central Shaft. They have been interpreted as splays from the main trend, breaking-off near Central Shaft but there is limited geological evidence to support this interpretation.
		In early 2014 Model Earth Pty Ltd completed a geological and structural review of the Bibiani Gold Mine. Onsite investigations comprised a three week campaign that included re-logging diamond drill core through representative sections of the deposit, geological mapping of the Bibiani Main Pit, inspection of accessible underground workings, and compilation of historical data. This work was used to create a 3D geological model of the Bibiani gold deposit. This model was used for the planning of the 26,000m diamond drilling program completed in early 2015.
		Based on grade information and geological observations, oxidation and mineralised domain boundaries have been interpreted and wireframes modelled to constrain the resource estimate in the Main Pit area. Interpretation and digitising of all constraining boundaries has been undertaken on cross sections orientated perpendicular to mine grid. The resulting digitised boundaries were used to construct wireframe surfaces and solids defining the three dimensional geometry of each interpreted feature.
Dimensions	The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.	Mineralisation in the Main Pit area lies within a vertical to steeply east dipping zone extending over approximately 2,300 metres of strike. The average dip of the mineralisation in the upper portion of the deposit is approximately 60°to the east although locally the dip is variable. At depth and to the north of the deposit the dip of the mineralisation becomes subvertical to vertical. The width of the mineralisation ranges from a few meters to over 60 metres. The mineralisation is complex and comprises multiple contiguous structurally controlled zones. The Main Zone is generally continuous with a number of smaller footwall and hanging wall subsidiary zones.
Estimation and modelling techniques	The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.  The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	For resource estimation the gold mineralisation has been modelled and constrained by a mineralised envelope based on geological modelling and grade shells generated using Leapfrog™ implicit modelling software.  The method of Multiple Indicator Kriging (MIK) was used to estimate gold. MIK of gold grades use indicator variography based on the resource composite sample grades within distinct mineralised populations defined by wire-frames. Within each domain gold grade continuity was characterised by indicator variograms at 14 indicator thresholds spanning the global range of grades.  Data viewing, compositing and wire-framing were performed using Micromine© software. Exploratory data analysis, variogram calculation and modelling, and resource estimation have been performed using Supervisor©, MP© and Micromine© software packages.  MIK was used as the preferred method for estimation of gold at Bibiani as the approach has been demonstrated to work well in a large number of deposits of diverse geological styles. The gold mineralisation seen at Bibiani is typical of that seen in most structurally controlled gold deposits and where the MIK method has been found to be of most benefit.
	<ul> <li>The assumptions made regarding recovery of by-products.</li> <li>Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterization).</li> </ul>	Resource block modelling included:  • Mineralized domains defined as Lode_E, Lode_N, Lode_S, Lode_W, Lode_W_nth and S13 along the strike of the orebody.



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	<ul> <li>In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.</li> <li>Any assumptions behind modelling of selective mining units.</li> <li>Any assumptions about correlation between variables.</li> <li>Description of how the geological interpretation was used to control the resource estimates.</li> <li>Discussion of basis for using or not using grade cutting or capping.</li> <li>The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.</li> </ul>	<ul> <li>2m composites extracted from the resource dataset excluding the underground channel sampling.</li> <li>Indicator variography developed based on the Au indicator transforms for each mineralized domain.</li> <li>Block model developed to cover the area of the main pit containing 5mE x 15mN x 6mRL blocks and attributes added to enable indicator grade estimates at varying Au cutoffs.</li> <li>Grade shells derived at 0.5g/t, 1.0g/t, 1.5g/t, 2.0g/t and 3.0g/t Au cut-offs.</li> <li>This interpretation was completed based on geological review and has captured both the broad mineralization halo and the higher grade &gt;2.0g/t Au material that has been determined to be the economic cut-off required. The drill hole database was flagged or constrained by the grade shells and mineralised domain envelope. In addition the drill hole database was flagged by modelled underground stopes and adits and any material flagged as being within underground voids has been excluded for the purposes of grade estimation, as it is considered high grade material that has already been mined. After consideration of the sampled interval lengths in the drill hole database, 2m run length composites were generated and coded by the grade shells.</li> <li>Variography is used to describe the spatial variability or correlation of an attribute. The spatial variability is traditionally measured by means of a variogram, which is generated by determining the averaged squared difference of data points at a nominated distance (h), or lag (Srivastava and Isaacs, 1989). The averaged squared difference (variogram or y(h)) for each lag distance is plotted on a bivariate plot, where the X-axis is the lag distance and the Y-axis represents the average squared differences (y(h)) for the nominated lag distance.</li> <li>Directional and downhole grade variography was generated to enable grade estimation using MIK. Variogram values have been calculated and modelled and the interpreted anisotropy directions rotated for each portion to c</li></ul>
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	All tonnages are estimated on a dry basis.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	The mineral resources were reported at a 2.0 g/t Au grade cut-off for Bibiani in this release. This cut off was chosen as the insitu marginal cut- grade estimation, using current estimates from the Snowden Scoping Study update on underground mining completed in 2015.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be	Mining methods for the extraction of gold at Bibiani has primarily been by open pit and underground methods. It is anticipated that large scale underground mining methods will be applied for the remaining resources. Grade control of ore stopes and drives will be based on sampling from high quality diamond drilling spaced appropriately for underground mining definition.  Bibiani was mined historically by open pit mining with a backhoe type excavator and truck operation. Beneath the open cut, mechanised and hand held underground open stope mining methods were used dating back to early 1900s.



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	reported with an explanation of the basis of the mining assumptions made.	Subsequent to the Ashanti Goldfields acquisition, approximately 2 million ounces of gold was recovered from combined underground and some surface quarrying operations. Mineralisation was identified in a number of north south striking subparallel / enechelon reefs with gold contained in quartz and sulphide ore zones within porphyry dyke intruded shear zones. In the historic underground mine several shafts were sunk commencing in the southern part of the deposit and progressing northwards. Underground mine development has been recorded to a vertical depth of 800 metres and over a strike of two kilometres.
Metallurgical factors or assumptions	The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.	The crushing circuit at Bibiani comprises a single stage gyratory crusher.  The ore zone is carbonated, silicified, albitised and sericitised. The pyrite content generally increases towards the ore body from the footwall and hanging wall with typically 2-3% observed in the central part of the ore body. Arsenopyrite has been observed within the ore body and is rarely found outside it. There is generally a good correlation between the presence of gold and the presence of arsenopyrite. The maximum arsenopyrite content is around 2-3%.  The ore host rock can be graphitic and carbonaceous with the graphite content increasing in the more intensely sheared zones and especially within stockwork mineralisation along the footwall. Historic processing data suggests the graphite has a preg-robbing effect. Gold mineralisation is closely associated with sulphides and photomicrographs show gold along sulphide margins or in cracks within sulphide which suggests it can be recovered by conventional leaching operations. The gold grain size distribution is reported as predominantly less than 50 microns however visible gold has been observed within some quartz veins. The circuit configuration includes a Knelson Concentrator which typically recovers up to 35% of the gold.  The majority of gold mineralisation is associated with quartz veins and quartz stockworks however the altered host rock contains a selvedge of mineralisation which can contain up to 2 g/t.  The milling circuit comprises 2.625 MW SAG mill and a 4.35 MW ball mill. Discharge from both mills reports to a common sump and is pumped to classification hydro cyclones. The cyclone underflow reports back to the ball mill, while the cyclone overflow reports to the first of seven leach tanks in the conventional CIL plant.
		Gold is recovered from loaded carbon in a four tonne capacity AARL elution plant. Gold is then deposited on to stainless steel cathodes in an electrolytic circuit.  Gold is into dore bars that historically have a fineness of 80% gold and 20% silver.
	Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the	Future processing operations would use the existing regulated tailings storage facility that was being used until 2013.
Environmental factors or assumptions	process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfield project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.	Some waste rock from future mining underground may be potentially-acid forming while the majority of waste rock will be non-acid forming. Waste rock dumping has been scheduled, along with encapsulation designs and optimization determined to minimize the risk of acid forming conditions from the waste rock dumping landform. The rehabilitation plan for the landform is also a key control.  Tailings generated from the project are not expected to be net acid forming potential and will be stored in the current regulated storage facility.
Bulk density	Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature,	Bulk density has been coded to the block model based on data provided by Noble Mineral Resources Limited. The average bulk density for each subdivision, as presented below, was coded via a block model script.



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	<ul> <li>size and representativeness of the samples.</li> <li>The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc.), moisture and differences between rock and alteration zones within the deposit.</li> <li>Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.</li> </ul>	<ul> <li>Backfill rock 1.80</li> <li>Oxide Metasediments 2.00</li> <li>Transition Metasediments 2.50</li> <li>Fresh Metasediments 2.75</li> <li>Fresh Porphyry 2.77</li> </ul>
Classification	<ul> <li>The basis for the classification of the Mineral Resources into varying confidence categories.</li> <li>Whether appropriate account has been taken of all relevant factors (i.e. relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).</li> <li>Whether the result appropriately reflects the Competent Person's view of the deposit.</li> </ul>	The resource classification has been based on the robustness of the various data sources available, including:  Geological knowledge and interpretation;  Variogram models and the ranges of the first structure in multi-structure models;  Drilling density; and  Estimation statistics.  The Resource estimate for the Bibiani Project deposit was classified as Measured, Indicated and Inferred Resources based on the confidence levels of key criteria such as kriging neighbourhood, data verification and validation. Resource classification codes were assigned to the block model.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	No audits or independent reviews have been undertaken on the current mineral resource estimate, although comparisons with previous estimates completed by Coffey Resources in 2012, are within acceptable accuracy.
Discussion of relative accuracy/ confidence	<ul> <li>Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.</li> <li>The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.</li> <li>These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.</li> </ul>	The relative accuracy of the Mineral Resource estimate is reflected in the reporting of Measured, Indicated and Inferred categories.  The relative accuracy of each resource is based on data quality, data quantity, geological confidence and the estimation accuracy.  The precision of the estimation is globally acceptable with the assumption that at a mining level more detailed grade control drilling will be required.  The geostatistical techniques applied to estimate the Bibiani deposit are deemed appropriate for the anticipated mining method.