SARACEN MINERAL HOLDINGS LIMITED

ACN: 009 215 347

Major Resource increase at Thunderbox underpins potential +10 year life

Project's 2Moz inventory cements Saracen's strategy to become a 300,000ozpa gold miner with long mine lives

Key Points

- **25% increase in total Mineral Resource at Thunderbox gold project in WA to 2.0Moz (37.4Mt at 1.7g/t)**
- **Result includes 345,000oz increase in the Indicated Resource category, taking it to 1.5Moz and further strengthening confidence in the inventory**
- **First gold production on track for mid-2016, forecast production of ~125,000ozpa at all-in sustaining cost (AISC) of A$1032/oz (March 2015 Feasibility Study)**
- **Outstanding potential for further Resource increases, with both Zone A and Zone C open down-plunge**
- **Thunderbox set to double production to ~300,000ozpa, making Saracen a genuine mid-tier ASX-listed miner**

Saracen Mineral Holdings (ASX: SAR) is pleased to announce that Mineral Resources at its second major WA gold project, Thunderbox, have increased by 417,000oz to 2.03 million ounces.

The result underwrites Saracen's strategy to establish Thunderbox as a ~125,000ozpa operation with all-in sustaining costs of A$1,032/oz. Recent drilling highlights the potential for a mine life exceeding 10 years.

The veracity of the Resource is underpinned by the fact that 1.5Moz, or 74%, of the updated estimate is in the Indicated category.

First production at Thunderbox, which is located near Leinster, is scheduled for mid-2016 following the recently announced development approval. The project's forecast capital cost is $65m (refer ASX Announcement – 23 March, Thunderbox Feasibility Study).

When combined with production from Saracen's Carosue Dam Operations in WA, Thunderbox will lift the Company's total production to a targeted level of ~300,000ozpa at a forecast AISC of <$1075/oz.

Saracen's Managing Director, Mr Raleigh Finlayson, said the resource upgrade further strengthened the Company's growth pipeline, demonstrating the potential for a long-life mine at Thunderbox.

"Importantly, recent drilling has also demonstrated the potential for further growth, with the two main zones of mineralisation remaining open down-plunge," he said.

Corporate Details:

14th May 2015

***ASX code*:** SAR

Corporate Structure:

Ordinary shares on issue: 792.8m

Unvested employee performance rights: 4.3m

Market Capitalisation: A$380m
(share price A$0.48)

Cash & Bullion (31 March): A$30m

Debt: Nil

Directors:

Mr Geoff Clifford
Non-Executive Chairman

Mr Raleigh Finlayson
Managing Director

Mr Mark Connelly
Non-Executive

Mr Barrie Parker
Non-Executive

Mr Martin Reed
Non-Executive

Ms Samantha Tough
Non-Executive

***Substantial Shareholders*:**

Wroxby Pty Ltd
63.5m (8.0%)

Paradice Investment Management
62.9m (7.9%)

Van Eck Associates Corporation
51.3m (6.5%)

Karara Capital Pty Ltd
41.0m (5.2%)

Eley Griffiths Group
40.3m (5.1%)

***Registered Office*:**

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Mineral Resource update

Following the successful completion of the Thunderbox drilling program an update of the Mineral Resource has been completed.

The update incorporates all new and existing data resulting in a total Mineral Resource (Indicated and Inferred) of 37,414,000 tonnes @ 1.7g/t for 2,035,000oz at 14 May 2015. This represents a 25% increase over the previous estimate.

Table 1: Thunderbox Mineral Resource by Category

Category	Previous Mineral Resource 2014			Current Mineral Resource 2015			Variance		
	Tonnes	Grade	Ounces	Tonnes	Grade	Ounces	Tonnes	Grade	Ounces
Indicated	20,547,000	1.8	1,167,000	27,177,000	1.7	1,512,000	6,630,000	-0.1	345,000
Inferred	9,137,000	1.5	451,000	10,237,000	1.6	524,000	1,100,000	0.1	73,000
Total	**29,684,000**	**1.7**	**1,618,000**	**37,414,000**	**1.7**	**2,035,000**	**7,730,000**	**0.0**	**417,000**

In March 2015 the Thunderbox Feasibility Study and Development Approval for Stage 1 was announced, with 556,533oz production forecast at an AISC of A$1,032/oz over an initial 4.5 year mine life. Stages 2 and 3 extend the project life via a bulk underground mine at Thunderbox and satellite open pit opportunities. (For further information please refer to the following ASX announcements: 23 March 2015 – "Thunderbox Feasibility Study and Development Approval", and 30 March 2015 – "Thunderbox Feasibility Study – Additional Information".)

For further information please contact:

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Competent Person's Statements

The information in the report to which this statement is attached that relates to Exploration Results and Mineral Resources is based upon information compiled by Mr Daniel Howe, a Competent Person who is a member of The Australasian Institute of Mining and Metallurgy and the Australian Institute of Geoscientists. Daniel Howe is a full-time employee of the company. Daniel Howe has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken 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'. Daniel Howe consents to the inclusion in the report of matters based on his information in the form and context in which it appears.

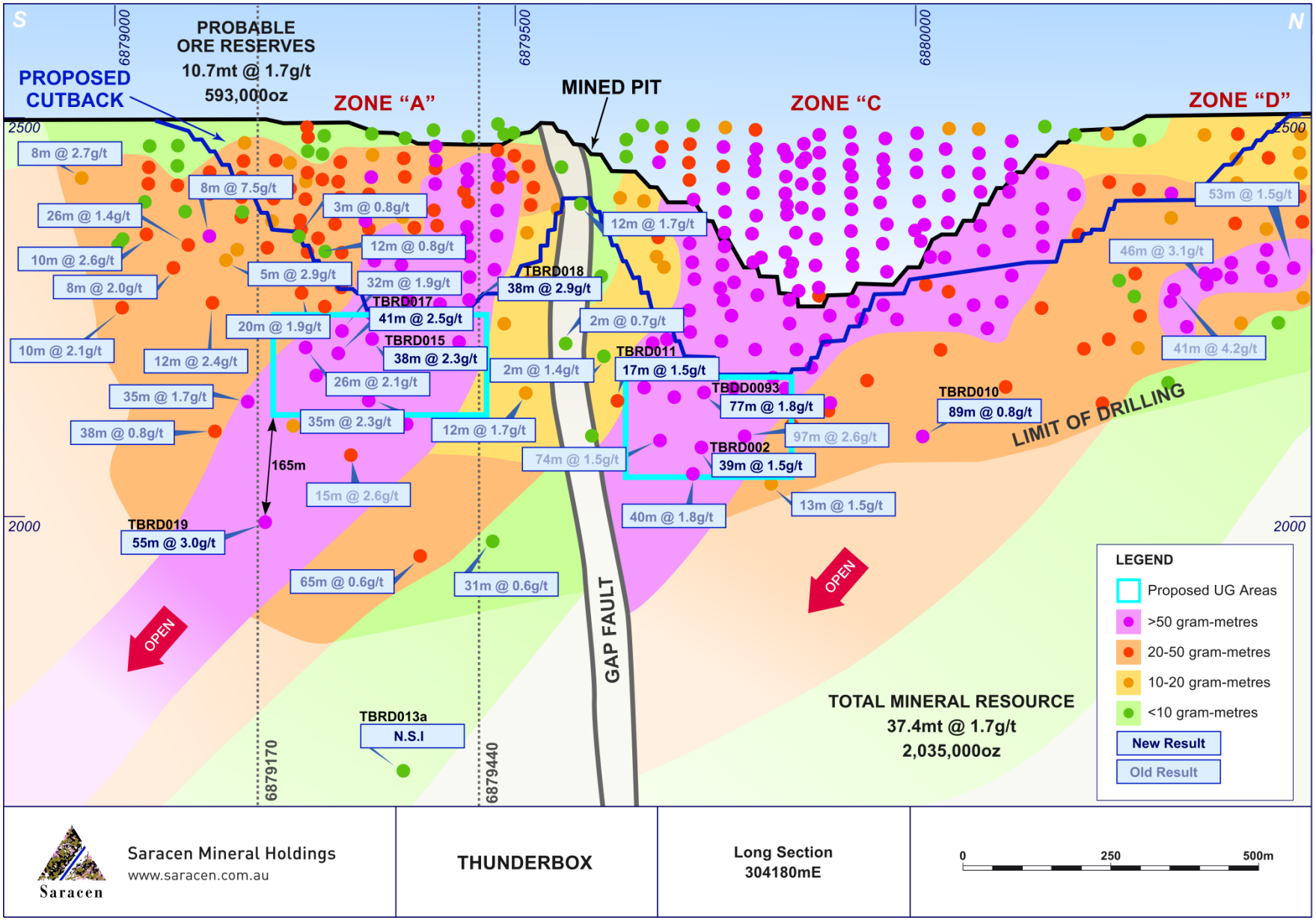

Figure 1: Long Section view of the Thunderbox deposit with recent drilling results

JORC 2012 Table 1 Thunderbox

Section 1: Sampling Techniques and Data		
Criteria	**JORC Code Explanation**	**Commentary**
Sampling Techniques	*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.*	Sampling methods undertaken by Saracen at Thunderbox include diamond drilling (DD) and reverse circulation (RC) drilling. Sampling methods undertaken by previous owners have included rotary air blast (RAB), DD and RC drilling and blast hole sampling within the pit. Limited historical data has been provided by previous owners.
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used	Sampling for diamond and RC drilling is carried out as specified within Saracen sampling and QAQC procedures as per industry standard. RC chips and diamond core provide high quality representative samples for analysis Historic RC, RAB, and DD core drilling is assumed to have been completed by previous holders to industry standard at that time (1999- 2007).
	Aspects of the determination of mineralisation that are Material to the Public Report. 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*	RC chips are cone split and sampled into 4m or 1m intervals with total sample weights under 3kg Diamond core is NQ or HQ sized, sampled to 1m intervals or geological boundaries where necessary and cut into half core to give sample weights under 3 kg. Samples are selected to weigh less than 3 kg to ensure total sample inclusion at the pulverisation stage. Saracen core and chip samples are crushed, dried and pulverised to a nominal 90% passing 75µm to produce a 40g sub sample for analysis by FA/AAS. All historic RAB, RC and DD and sampling is assumed to have been carried out to industry standard at that time. RC grade control drilling was used to obtain 1m samples or 2m composite samples from which 3 kg was pulverised to create a 50g charge for fire assay, while blast hole samples were composited into 2.5m before a 3kg sample was obtained for pulverising to a final 50g charge for fire assay.
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 deposit was initially sampled by 470 RAB holes. Further drilling included 306 RC holes (assumed standard 5 ¼ ''bit size) , 216 HQ, NQ and PQ diamond drillholes , approximately 15,400 blast holes and 2,400 RC grade control holes. Some diamond drilling carried out for geotechnical studies was oriented (the method is unknown), it is unknown if other core was oriented. Saracen completed 21RC drillholes, 8 diamond geotechnical holes and 17 RC precollar diamond tail drillholes (precollars averaging 277m, diamond tails averaging 200m). The RC drilling was completed with a 5.5 inch diameter bit with a face sampling hammer. The rig was equipped with an external auxiliary booster. Diamond drilling was HQ or NQ diameter. Drill core was oriented utilising an ACT II core orientation tool.
Drill Sample Recovery	*Method of recording and assessing core and chip sample recoveries and results assessed*	Recoveries for RC drillholes and precollars are recorded as a percentage based on a visual weight estimate. Recoveries for some grade control drilling and blast hole sampling have been recorded based on a visual weight estimate. No other recoveries have been provided, it is unknown if they were recorded
	Measures taken to maximise sample recovery and ensure representative nature of the samples	During RC drilling daily rig inspections are carried out to check splitter condition, general site and address general issues. Measures were taken to supress groundwater. Diamond core is reconstructed into continuous runs on an angle iron cradle for orientation marking.

Section 1: Sampling Techniques and Data		
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		Depths are checked against depth given on the core blocks. Historical drilling is assumed completed to industry standard at that time
	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.	There is no known relationship between sample recovery and grade for RC drilling. Diamond drilling has high recoveries meaning loss of material is minimal. Any historical relationship is not known.
Logging	*Whether core and chip samples have been geologically and 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.*	Logging of RC chips and diamond drill core records lithology, mineralogy, texture, mineralisation, weathering, alteration and veining. Geotechnical and structural logging is carried out on all diamond holes to record recovery, RQD, defect number, type, fill material, shape and roughness and alpha and beta angles. Chips from all RC holes are stored in chip trays for future reference while remaining core is stored in core trays and archived on site. Core is photographed in both dry and wet state. Qualitative and quantitative logging of historic data varies in its completeness.
	The total length and percentage of the relevant intersections logged	All drillholes completed by Saracen have been logged in full.
Sub-sampling techniques and sample preparation	*If core, whether cut or sawn and whether quarter, half or all core taken.*	All drill core is cut in half onsite using an automatic core saw. Duplicate core samples are quarter cored. Samples are always collected from the same side.
	If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.	All exploration RC samples are cone split. Occasional wet samples are encountered. The sampling method for historic RAB and RC drilling is unknown. Grade control RC drilling has been cone split while blast hole sampling has been riffle split. Wet drilling was rarely encountered, and extra care was taken to clean the splitter after encountering wet samples. Drillholes in puggy, wet clays were abandoned and redrilled once dewatering of the pit had commenced. Care was taken to adjust the splitter orifice for grade control drilling to ensure the sample weight did not exceed 3kg, meaning no subsampling was needed at the preparation stage.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	The sample preparation of diamond core and RC chips adhere to industry best practice. It is conducted by a commercial laboratory and involves oven drying, coarse crushing then total grinding to a size of 90% passing 75 microns. The sampling techniques for historic exploration RAB, RC and DD drilling are unknown, best practice is assumed. The sample preparation of RC grade control drilling and blast hole sampling involved oven drying, coarse crushing and total grinding in an LM5.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	All subsampling activities are carried out by commercial laboratory and are considered to be satisfactory. Best practice is assumed at the time of historic RAB, DD and RC sampling. Procedures adopted to ensure sample representivity for RC grade control and blast hole sampling included weight analysis to determine split ratio (at least 2 holes per program) and sizing analysis of every 25th sample, with an expected return of 90% passing 75um.
	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.	RC field duplicate samples are carried out at a rate of 1:20 and are sampled directly from the on-board splitter on the rig. These are submitted for the same assay process as the original samples and the laboratory are unaware of such submissions. It is unknown if duplicate sampling was performed on historic exploration RAB, RC and DD drilling. Field duplicates were carried out on RC grade control drilling at a rate of one per hole, collected from the second sample port on the cone splitter. Duplicates were carried out at a rate of 1 in 20 for blast hole sampling.

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	Whether sample sizes are appropriate to the grain size of the material being sampled.	Analysis of data determined sample sizes were considered to be appropriate.
Quality of assay data and laboratory tests	*The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.*	RC chip samples and diamond core are analysed by an external laboratory using a 40g fire assay with AAS finish. This method is considered suitable for determining gold concentrations in rock and is a total digest method. A 50 gram fire assay with AAS finish was used to determine the gold concentration for all grade control samples. This method is considered suitable for determining gold concentrations in rock and is a total digest method. Methods for exploration RC, RAB and DD drilling included fire assay with AAS finish, BAAS and unknown methods.
	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.	The clay mineralogy of the deposit was investigated using PIMA (Portable Infra-red Microscopic Analyser) analysis to assist with geological interpretation. This data was not used in the estimation process.
	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.	Certified reference material (standards and blanks) with a wide range of values are inserted into every drillhole at a rate of 1:25 for exploration RC and DD. These are not identifiable to the laboratory. QAQC data returned are checked against pass/fail limits with the SQL database and are passed or failed on import. A report is generated and reviewed by the geologist as necessary upon failure to determine further action. QAQC data is reported monthly. Sample preparation checks for fineness are carried out to ensure a grindsize of 90% passing 75 microns. The laboratory performs a number of internal processes including standards, blanks, repeats and checks. QAQC data analysis demonstrates sufficient accuracy and precision. Industry best practice is assumed for previous holders.
Verification of sampling and assaying	*The verification of significant intersections by either independent or alternative company personnel.*	Significant intercepts are verified by the Geology Manager and corporate personnel
	The use of twinned holes.	A number of exploration RC holes were drilled to twin original RAB holes and verify results.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols	Primary data is collated in a set of excel templates utilising lookup codes. This data is forwarded to the Database Administrator for entry into a secure acQuire database with inbuilt validation functions. Data from previous owners was taken from a database compilation and validated as much as practicable before entry into the Saracen acQuire database
	Discuss any adjustment to assay data.	No adjustments have been made to assay data. First gold assay is utilised for resource estimation.
Location of data points	*Accuracy and quality of surveys used to locate drillholes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.*	Exploration drillholes are located using a Leica 1200 GPS with an accuracy of +/- 10mm. Downhole surveys are carried out using a hired Reflex EZ-gyro by the respective drilling companies on a regular basis, between 10-30m.
	Specification of the grid system used.	MGA Zone 51 grid coordinate system is used
	Quality and adequacy of topographic control.	Kevron Geomatic Services flew and processed aerial photography and provided ortho images at 1:5000 scale over the Thunderbox deposit and environs.
Data spacing and distribution	*Data spacing for reporting of Exploration Results.*	The nominal spacing for drilling is varied from 20mx20m to 40mx40m
	Whether the data spacing and distribution is sufficient to establish the degree of geological and grade	The drilling is distributed and spaced such that geological and grade continuity can be established to estimate the mineral resource and ore reserve appropriately. The mineralisation is continuous over a 2km

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	continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.	strike length, therefore the 80m x 80m exploration drill spacing effectively defines the continuity.
Orientation of data in relation to geological structure	*Whether sample compositing has been applied.*	RC precollar sampling was composted into 4m samples. Historic RAB drilling was sampled with 4m composite samples. Grade control RC drilling was carried out on 2m composite samples, while blast hole sampling was carried out on 2.5m composites.
	Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.	The bulk of the drilling has been oriented to the east in order to provide the best intersection angles possible for the steeply west dipping orebody.
	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.	All drilling from surface has been drilled as close to perpendicular as possible. This has reduced the risk of introducing a sampling bias as far as possible.
Sample security	*The measures taken to ensure sample security.*	Samples are prepared on site under supervision of Saracen geological staff. Samples are selected, bagged into tied numbered calico bags then grouped into secured cages and collected by the laboratory personnel. Sample submissions are documented via laboratory tracking systems and assays are returned via email
Audits or reviews	*The results of any audits or reviews of sampling techniques and data.*	An internal review of companywide sampling methodologies was conducted to create the current sampling and QAQC procedures. No external audits or reviews have been conducted

Section 2: Reporting of Exploration Results		
Criteria	**JORC Code Explanation**	**Commentary**
Mineral tenement and land tenure status	*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.*	M36/504, M36/512 and M36/542 form part of the Thunderbox project currently being acquired by Saracen, and are in good standing. There are no native title claims over the Thunderbox deposit. A number of heritage surveys have been undertaken with Aboriginal groups with no sites of significance identified. In addition a detailed archaeological survey has been conducted with no sites of significance identified
	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.	The tenements are in good standing and the license to operate already exists.
Exploration done by other parties	A*cknowledgment and appraisal of exploration by other parties.*	Extensive nickel exploration was undertaken in the area during the 1960s and 1970s. Grassroots gold and PGE exploration was undertaken during and since the 1980s by BHP, Dominion, Dalrymple Resources and Forrestania Gold. Thunderbox was discovered in 1999.
Geology	*Deposit type, geological setting and style of mineralisation.*	Thunderbox is a mesothermal lode gold deposit located at the southern end of the Yandal greenstone belt in an area where several major shear zones converge and join with the Perseverance Fault. The shear zone dips at 30° to 60° WSW, with the exception in the vicinity of the mineralisation, where the shear is vertical to steeply dipping. Mineralisation is hosted by strongly deformed, silicified and carbonate altered albite-quartz porphyry in the hangingwall of the shear zone. The shear juxtaposes foliated basalts and intrusive porphyries in the hangingwall against sedimentary rocks in the footwall. The zone of

Section 2: Reporting of Exploration Results		
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		shearing is over 200m wide. An ultramafic unit occurs within the shear, in the footwall of the deposit and is attenuated along the shear. The main gold related hydrothermal alteration assemblage comprises quartz-ankerite-arsenopyrite-pyrrhotite-galena and gold. This assemblage has been overprinted by a retrograde chlorite-epidote-white mica-biotite-quartz and pyrite assemblage. Syn-mineralisation veins have a continuum of vein textures ranging from laminated to pseudo-breccias.
Drillhole information	*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:* • *easting and northing of the drill hole collar* • *elevation or RL (Reduced Level – elevation* • *above sea level in metres) of the drill hole collar* • *dip and azimuth of the hole* • *down hole length and interception depth* • *hole length.* • *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.*	A total of 458 holes have been used in the mineral resource and are deemed to be material. It is not practical to summarise all of the holes here in this release. Future drill hole data will be periodically released or when results materially change the economic value of the project. Exclusion of the drilling information will not detract from the reader's view of the report.
Data aggregation methods	*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.*	All significant intercepts have been length weighted with a minimum Au grade of 0.5ppm. No high grade cut off has been applied.
	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.	Intercepts are aggregated with minimum width of 1m and maximum width of 3m for internal dilution.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	There are no metal equivalents reported in this release.
Relationship between mineralisation widths and intercept lengths	*These relationships are particularly important in the reporting of Exploration Results.* *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* *If it is not known and only the down hole lengths are reported, there should be a clear statement to this*	This announcement includes sufficient detail to clearly illustrate the geometry of the mineralisation and the recent drilling. All results are reported as downhole lengths. The geometry of the mineralisation is well known and true thickness can be calculated. Drilling intersects the mineralisation perpendicular and at an average intersection angle of 45 degrees.

Section 2: Reporting of Exploration Results		
Criteria	**JORC Code Explanation**	**Commentary**
	effect (eg 'down hole length, true width not known').	
Diagrams	*Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	Included in this release is an appropriately orientated longsection of the mineralisation, illustrating the centroids of the intercept point projected to a plane. Included also in this release are cross section views of the mineralisation which provides the visual perspective of the typical drilling angle.
Balanced Reporting	*Where comprehensive reporting of all Exploration Results are not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	All results from the recent campaign have been reported, irrespective of success or not.
Other substantive exploration data	*Other exploration data, if meaningful and material, should be reported including (but not limited to): 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.*	Historic activities have included drilling to obtain samples for metallurgical test work, bulk density analyses and geotechnical analyses. A number of geophysical surveys including dipole-dipole IP, Gradient array IP and TEM were carried out over known mineralisation to determine effectiveness in delineating mineralisation/alteration. None were deemed effective. An environmental survey investigated the erosional characteristics of the soil, surface hydrology and groundwater and identified no issues. A partial leach soil sampling program carried out over the deposit was deemed effective in identifying anomalous gold values associated with the deposit. A detailed structural review of the mineralisation has been conducted by Model Earth
Further work	*The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).* *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive*	Saracen is currently working on establishing exploration opportunities which will extend the known mineralisation at depth. This will primarily focus on understanding the key geological relationships and critical continuity directions to target depth extensions.

Section 3: Estimation and Reporting of Mineral Resources		
Criteria	**JORC Code Explanation**	**Commentary**
Database Integrity	*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.*	Saracen stores all its data in an AcQuire SQL database. The primary database is regulated by a locked framework called the acquire data model which fixes the relationships between tables. The data model minimises the potential for data collection and data usage errors through pre-determined look up tables, storage and export functions. User defined permissions also regulate the ability to add, edit or extract data. Saracen's Database contains historical data compiled by previous owners and the methods used to process and record the primary data are unknown at this stage. Typical methods are manual translation of logging and data capture from written logs, direct import of csv tables through a data import scheme where data is validated upon import or direct data entry options into the database using predefined look up values. All the recent drilling done by Saracen at Thunderbox has been processed using the latter method.
	Data validation procedures used.	The rigid structure of the acquire data model is such that predefined rules and look up tables are applied to all data entry. Data that does not meet the criteria are highlighted and moved to a buffer area until the data is rectified to meet the passing rules.
Site Visits	*Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*	The competent person together with other Saracens' geology personnel have carried out site visits to the Thunderbox deposit on numerous occasions. The competent person has inspected the deposit and has built a sound understanding of the deposit geology. All geological processes undertaken by Saracen concerning the Thunderbox Resource have been done using Saracen's standard procedures.
	If no site visits have been undertaken indicate why this is the case.	n/a
Geological Interpretation	*Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.*	The interpretation has been based on the detailed geological work completed by a series of previous owners of the project. This knowledge is based on extensive geological logging of drill core, RC chips, detailed open pit mapping and assay data. The gross architecture of the deposit is simple and the interpretation is robust. Saracen also engaged the services of an independent geological consultant to assist in creating a geological model that was used to guide the estimation of resources.
	Nature of the data used and any assumptions made.	The interpretations have been constructed using all available geological logging descriptions including but not limited to, stratigraphy, lithology, texture, and alteration. Interpreted cross cutting faults have been observed and have been use to guide disruptions in the position of the key mineralised domains. Open pit mapping had been included in the interpretation, however only affects the location of the domain boundaries inside the previously mined open pit. Cross sectional interpretations of the mineralisation have been created and from the basic framework through which the 3D wireframe solid is built.
	The affect, if any, of alternative interpretations on Mineral Resource estimation.	Due to the simplistic nature of the mineralisation no alternative interpretations have been considered. Over the life of the project several different sources have interpreted the mineralisation and all agree on the same basic interpretation.
	The use of geology in guiding and controlling the Mineral Resource estimation.	The wireframe domains are constructed using all available geological information (as stated above) and terminate along known structures. Mineralisation styles, geological homogeneity, and grade distributions for each domain (used to highlight any potential for bimodal populations) are all assessed to ensure effective estimation of the domains.
	The factors affecting continuity both of grade and geology.	At the deposit scale the gold distribution is uniform throughout the orebody. The mineralisation terminates abruptly at the contacts of either the felsic to intermediate porphyry or the "hybrid" zones. The distribution

Section 3: Estimation and Reporting of Mineral Resources		
Criteria	**JORC Code Explanation**	**Commentary**
		is the result of the pervasive brittle fracturing of the porphyry and subsequent pervasive alteration. Infrequent higher grade zones are associated with either narrow laminated quartz veins or irregular zones of intense brecciation at the contacts of the porphyry host. Gold mineralisation appears to be related to the type and abundance of sulphides and carbonate alteration. Grades are generally higher in arsenopyrite and ankerite rich zones and lower in pyrite and dolomite rich zones. Pyrite is generally coarse, euhedral and late. The presence of pre-, syn-, and post deformational sulphides suggests multi-phase episodes of deformation and mineralisation.
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.*	Thunderbox mineralisation extends from 6879000mN to 6881000mN, 304000mE to 304400mE and 500 meters below surface (MGA-Zone51). The Thunderbox shear generally strike NNW and dips 60° towards the WSW. In the vicinity of the strongest gold mineralisation the shear is vertical to steeply west dipping. The shear and mineralisation is offset across a series of dextral, NE trending faults.
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.*	Block estimation using ordinary kriging has been completed in Micromine. All wireframes have been constructed in Micromine, which were used as hard boundaries for the estimations. Grade was estimated into parent blocks, meaning all the sub-cells within a parent cell assumed the grade of the parent cell. Univariate statistical analysis of length weighted (1m) domain coded downhole composites have been completed for all domains and top-cuts applied where applicable. Extreme grades are not common in the data set and all domains have been analysed individually to determine specific top-cut values. Due to the lack of extreme grades the top-cut process affects only 1-2% of the data. Variogram modelling was completed with Snowden's Supervisor software. This measures the spatial variance of the gold grade within the domains. The parameters determined from this analysis were used in the interpolation process.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	Historical mine production and mill reconciliation records suggest that the estimation method and parameters used result in a highly accurate estimate of the resource. Over the 6 year life, the resource reconciled at 98.5%. There is no evidence in the geology to suggest this trend would not continue.
	The assumptions made regarding recovery of by-products.	No assumptions have been made with respect to the recovery of by-products.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulfur for acid mine drainage characterisation).	There has been no estimate at this point of deleterious elements. Arsenic has been found in some samples
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	The parent block sizes for the resource model are 5m(X) by 20m(Y) by 5m(Z). These are deemed appropriate for the majority of the resource, where drill spacing is in the order of 40m x 40m. Parent blocks have been sub-celled to 1m(X) by 2m(Y) by 1m(Y) to ensure that the wireframe boundaries are honoured and preserve the location and shape of the mineralisation. Search ranges have been informed the variogram modelling and knowledge of the drill spacing and the known mineralisation geometry including direction of maximum continuity. Three search estimation runs are used with the aim to satisfy the minimum sample criteria in the first search range where possible. A kriging neighbourhood analysis study conducted ensured that the block sized and the search volume used in the resource estimate were optimal after considering all the relevant factors (i.e. drill spacing, geometry and dimensions of mineralisation).
	Any assumptions behind modelling of selective	No selective mining units have been assumed at this stage. Given the successful mining activities at

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	mining units.	Thunderbox. Saracen has studied all the historical data and is confident that it can mine the Thunderbox deposit successfully.
	Any assumptions about correlation between variables.	No assumptions have been made regarding correlation between variables. Gold is the only mineral of economic significance at Thunderbox at this stage.
	Description of how the geological interpretation was used to control the resource estimates.	The geological interpretation strongly correlates with the mineralised domains. Specifically where the mineralised domain corresponds with the felsic to intermediate porphyry intrusion. Where well known the geological unit is described in the block model. All wireframe boundaries including those where lithology and mineralisation correspond, hard boundaries are enforced.
	Discussion of basis for using or not using grade cutting or capping.	Statistical analysis of all domains highlight that there are very few grades in the domain populations that require top-cutting. Top-cuts have been employed to eliminate the risk of overestimating in the local areas where a few high grade samples exist.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Several key model validation steps have been taken to validate the resource estimate. The mineral resource model has been stepped through visually in sectional and plan view to compare the composite grades used in the estimate and the resultant block grades. This has also been carried out in 3D with the composite grades and a point cloud of the model grades. Northing and Elevation swathe plots have been constructed to evaluate the composited assay means against the mean block estimates. The mineral resource model has been constructed to include kriging efficiency and the slope of regression values. These values are used to measure the quality of the estimate. Natural deterioration of the quality is observed at the perimeter of the modelled areas where data density is lower. The estimate was checked against previously reconciled production records received during the due diligence process, which match very closely.
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.*	Based on Saracen's current economic operations at Carosue Dam, and the natural grade distinction above background, a grade of 0.5g/t has been chosen.
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 reported with an explanation of the basis of the mining assumptions made.*	The Thunderbox deposit is amenable to mining by both open pit and underground methods. The deposit has successfully been mined by open pit in the past between 2002 and 2007. There are reasonable grounds to assume that in the future this deposit will again be mined by conventional open pit load and haul operations. Beneath the previously mined pit is a portion of the mineral resource that has potential to be extracted by a bulk underground method. It has been discussed that in the thicker potions of the resource that an underground caving approach may be an efficient means of economic extraction. With supplementary traditional long hole stoping in areas with narrower widths.
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*	The Thunderbox gold deposit consists of free milling gold which occurs as inclusions within, and at the rims of arsenopyrite crystals, and as free gold clusters within quartz-carbonate veins. It is expected that any future mining of the Thunderbox deposit will be processed at the onsite processing

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	prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment process 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.	facility which is currently on care and maintenance. The Thunderbox mill employs a conventional crushing, grinding and CIL leaching process to extract the gold. The mill operated successfully between 2002 and 2007, processing in excess of 9Mt of ore. The conventional plant displayed excellent performance with gold recoveries between 93.4 to 96.6 % over the life of the mine. Importantly it should be noted that no reduction in recoveries were observed when the ore changed from oxide-transitional into fresh rock.
Environmental factors or assumptions	*Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the 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 greenfields 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.*	As arsenic is present in the mineralogy of the deposit, the processing plant has been designed to ensure effective management of potentially harmful arsenic contamination. A 20m diameter high rate thickener is used to thicken the tails to maximise water and cyanide recovery. Process water is added to the thickener feed to create one wash stage prior to detoxification. Arsenic precipitation is effected in a stirred closed tank with air sparging. Ferric sulphate solution is metered into the reactor on the basis of dissolved arsenic concentration. The fumes from the precipitation tank are passed through a packed bed caustic scrubber before venting to the atmosphere. The precipitation tank overflow is then passed to the tails hopper.
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, size and representativeness of the samples.*	Previous owners took routine density measurements when drilling diamond core, along with a comprehensive grab sampling regime during the mining of the pit. At this point Saracen does not have the available data to comment on the frequency and distribution of the density measurements. The method of calculation is the water displacement technique. Measurements have been recorded in the acquire database and extraction schemes pair this data with the major lithology code for statistical analysis. From the recent drilling done by Saracen 237 fresh mafic samples, 196 fresh porphyry samples, 348 fresh sedimentary rock samples and 47 tectonite shear samples were measured for bulk density. Overall the results confirm the values currently being used in the Thunderbox model. 10cm length NQ core samples were taken in one meter intervals in the ore zones and every 30m in waste zones.
	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.	The procedure the previous owners utilised, included the coating of dried samples in paraffin wax where the samples had some degree of weathering, were porous or clay rich. These coated samples were then tested using the water displacement technique as previously mentioned. Saracen has applied the same procedure in its latest round of drilling.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	An average mean of densities collected for each lithology type has been uniformly applied to the modelled geological units. This includes the primary fresh lithologies as well as the weathered oxide and transitional zones.
Classification	*The basis for the classification of the Mineral Resources into varying confidence categories.*	The mineral resource has been classified into Measured, Indicated and Inferred categories based on drill hole spacing, geological confidence, and grade continuity and estimation quality. The combination of these factors together guide the digitising of a “cookie cutter” string in long section view which selects and codes the appropriate blocks with the nominated resource classification category.

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	Whether appropriate account has been taken of all the relevant factors (ie 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).	All care has been taken to account for relevant factors influencing the mineral resource estimate. Confidence in the predicted tonnes and grade estimated in the model is high and previous mining performance suggests that the input data and geological continuity are such that a robust resource estimate can achieved.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The geological model and the mineral resource estimate reflect the competent person's view of the deposit.
Audits or reviews	*The results of any audits or reviews of Mineral Resource estimates.*	At the completion of every resource estimate Saracen Gold Mines undertake an extensive review of the model that covers model inventory and comparisons to previous and budget models. Geological interpretation, wire-framing, domain selection, statistics by domain, assay evaluation, parent cell sizes, data compositing, variography, search strategy, estimation and Kriging Neighbourhood Analysis and finally model validation and resource categorisation are all discussed and scrutinized by the geological and mine planning teams.
Discussion of relative accuracy/confidence	*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.*	The mineral resource has been reported in accordance with the guidelines established in the 2012 edition of the JORC code. Saracen Gold Mine uses a standard approach to resource estimation and the procedure requires the systematic completion of the Saracen Resource Estimation Document that is thoroughly investigated and assessed in the Model review process, as stated above.
	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.	The statements relate to a global estimate of tonnes and grade.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Previous mining operation reports suggest that the estimated tonnes were within 0.4% and grade within -2.3%. No substantial changes have influenced the remaining mineral resource.