EXPLORATION REPORT

INITIAL ASSESSMENT OF THE EXPLORATION PROGRAMMES IN THREE DIAMOND & GOLD PROJECTS HELD BY GOLDEN SAINT RESOURCES IN SIERRA LEONE, AUGUST (WET SEASON) 2015

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EXECUTIVE SUMMARY

This document summarises the preliminary observations, conclusions and recommendations made by Rock Forage Consulting Services to the Golden Saint Resources Limited (GSR) licences of Baja, Tongo and Moa held for diamonds and gold in south-eastern Sierra Leone. The licences fall within a mature diamond and gold mining area, spanning some 80 years. Nonetheless, the following residual alluvial diamond and gold potential and new kimberlite potential was identified:

Alluvial Diamond and Gold Potential
The remaining alluvial diamond potential lies mainly in deeper, more difficult to access targets within the main channels, floodplain (flats) and low terrace deposits of the Sewa River (Baja licence), Woa River (Tongo licence) and Moa River (Moa licence). Consequently, innovative exploration techniques will be required to identify remaining alluvial targets with the best economic potential, in terms of grade and/or revenue, or a combination of both attributes. Likewise flexible, robust mining and treatment methods will be required to extract the diamonds and gold economically. To this end, and given the tropical climatic conditions in terms of weathering profiles, wet-based methods are likely to be more successful than dryland operations. To date, alluvial free gold has been recovered only from the Woa River floodplain (flats) basal gravel mini-bulk samples but its presence should be more diligently sought in the finer fractions of the more conventional alluvial diamond targets.

Kimberlite Potential
To date, the majority of primary kimberlite occurrences in Sierra Leone have been kimberlite dykes – some with exceptionally high grades and good quality diamonds – and subordinate kimberlite pipes have been found outside the GSR licences. However, from a high quality airborne magnetic survey, kimberlite targets have been picked for follow up exploration in the Baja and Tongo licences but not in the Moa licence which is more prospective for gold than primary diamond occurrences. These targets are currently being reviewed and integrated with GSR initial sampling results in order to optimise a kimberlite follow up program which will be focussed, at least initially, on the north-western portion of the Baja licence and the northern section of the Tongo licence.

Primary Gold Potential
The most promising primary gold potential, with a possibility of secondary lateritic deposits, lies within the Moa licence whose north-western boundary abuts the foothills of the Kambui Hills – a greenstone belt. The gold targets identified from the airborne magnetic survey are being reviewed but in the interim period at the end of the 2015 Wet Season a reconnaissance geochemical soil sampling programme focused on gold has been planned for the Moa licence. These results will guide a follow up programme that will integrate the stream sediment sampling with this larger, reconnaissance-level campaign as well as the airborne geophysics.
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1 INTRODUCTION

1.1 Background

With the Ebola crisis in Sierra Leone diminished, Golden Saint Resources Limited (GSR) has re-commenced exploration in their three diamond and gold licences (Figure 1) held in the south-east of that country, viz., Baja (EL87/2011), Tongo (EL86/2011) and Moa (EL07/2012). All three licences lie south of the main Koidu–Yengema diamond fields with the Tongo licence south-east of the Panguma–Tongo diamond fields and the Moa licence on the south-eastern side of the auriferous Kambui Hills greenstone belt (Figure 1). GSR has engaged Rock Forage Consulting Services (Rock Forage) from Rock Forage Mining Ltd to advise and assist with the resumption of exploration activities that were severely curtailed by the outbreak of Ebola. Although diamonds and gold have been mined for over 8 decades in south-eastern Sierra Leone, new geophysical methods and robust water-based mining techniques provide opportunities to explore the remaining economic potential in the three GSR licences.

This document summarises the observations made by Rock Forage consultants Pierre Fourie (mining engineer) and John Ward (geologist) during their first site visit to the Baja, Tongo and Moa licences as well as the GSR country office in Freetown. This visit was undertaken in late August 2015, at the peak of the Wet Season, in order to appreciate fully the potential operational constraints during this time. Given the August 2015 wet conditions, the sites visited within each licence are shown in Figure 2, which also highlights the principal drainages that dissect the Inland Plateau and debouch onto the Coastal Plain in south-eastern Sierra Leone.

Prior to the Ebola outbreak, GSR commissioned Geotech Ltd of Canada to fly fixed wing magnetic gradiometer and spectrometry surveys over each of the licenses in October – November 2013. Data acquisition were of high quality and Core Geophysics Pty Ltd of Australia completed the processing, imaging and targeting of these airborne magnetic data in February 2014. These reports are currently under review by Rock Forage for follow up in the forthcoming 2015-2016 Dry Season, as are the exploration data already gathered by GSR through geological mapping and reconnaissance stream sediment sampling campaigns carried out by their Sierra Leonian field teams. In addition, Rock Forage has drawn on the comprehensive account on diamonds by P. K. Hall (1969: The Diamond Fields of Sierra Leone, Geological Survey of Sierra Leone, Bulletin 5) and gold information provided in P-K Freitag country summary (1974: The Mineral Potential of Sierra Leone, Geological Survey Division, Ministry of Mines, Freetown, Sierra Leone, under Federal German Assistance).

The preliminary recommendations by Rock Forage is that GSR carry out a reconnaissance gold-oriented soil sampling programme in the Moa licence for the remainder of the 2015 Wet Season whilst preparing to investigate the secondary alluvial diamond opportunities left along the Sewa River in the Baja licence, the Woa River in the Tongo licence and the Moa River in the Moa licence and concomitantly reviewing the primary kimberlite potential in all three licences.
Figure 1: Location of the Baja, Tongo and Moa diamond and gold licences held by Golden Saint Resources in south-eastern Sierra Leone.
Figure 2: Sites within Baja, Tongo and Moa licences visited during August 2015 (peak Wet Season). The principal drainages dissect the Inland Plateau and debouch onto the Coastal Plain in south-eastern Sierra Leone.
2 BAJA (BADJIA) LICENCE (EL87/2011)

2.1 Alluvial Diamond Potential - Field Observations

The comparatively large (240 km$^2$) Baja licence hosts more than 8 km of the Sewa River, which is the largest river in Sierra Leone and has yielded a significant portion of the alluvial diamonds recovered in Sierra Leone (Figure 3; Hall, 1969). The principal alluvial targets are the main river channel and the narrow belt of intermittent floodplain (flats) and low terraces that have not been accessed due to overburden thickness and/or high water tables:

2.1.1 Main Channel

Although the main Sewa channel has been heavily mined for decades by divers, coffer dams and airlift systems (Hall, 1969), the thicker sand overburden areas have protected deeper pool reaches that have economic potential. During the Wet Season, the Sewa River runs approximately 4 m higher than its Dry Season levels (Figure 4), and thus the remaining potential in the middle Sewa reach that falls in the Baja licence will be evaluated more easily in the coming Dry Season. This approach will use a combination of bathymetric surveys, possibly supplemented by Ground Penetrating Radar surveys, to detect deeper scours and depressions, as well as integrating local knowledge to identify residual alluvial diamond placer deposits. Significantly, the resistant, quartz-rich basal gravels are medium- to coarse-grained (Figure 5) and, together with the sand overburden, are virtually clay-free, promoting ready extraction by dredge suction methods and/or platform-mounted excavators.

The principal indicator of alluvial diamond concentration in these settings is water-worn corundum (Hall, 1969), supplemented by epidote – which is a more common indicator in central and southern African rivers (Figure 6). Oversize granite, gneissic and amphibolite boulders, derived from the local Archaean Basement, play an important role in concentrating diamonds in the basal gravels of rivers such as the Sewa (Figure 7), Tongo and Moa.

The aim is to determine the residual potential of the main Sewa channel and to obtain contemporary grade and diamond information from those relict patches that have economic promise in terms of size (carat grade or volume in m$^3$).
Figure 3: The Baja Licence, outlined in red, includes some 8 km of the Sewa River along its eastern border with residual alluvial diamond potential in the main channel and flanking, intermittent floodplains (flats) and low terraces and kimberlite potential in the north-western portion.
Figure 4: Sewa River in full flood, August 2015. View downstream from the old railway bridge pylons on the Bo – Kenema Road.

Figure 5: The basal gravels of the Sewa River gravels are dominated by resistant quartz and quartzite pebble and cobble-sized clasts.
Figure 6: Water-worn corundum (C), together with greenish epidosite pebbles (E), are important indicators of alluvial diamond concentration in the Sewa River and adjacent terrace deposits.

Figure 7: Boulder oversize clasts promote the trapping of heavy minerals, including diamond, corundum and epidosite, in the basal gravels of the Sewa River. Notebook 14 cm high (circled) for scale.
2.1.2 *Low Terrace*

The remaining potential in the low terraces flanking the Sewa River in the Baja licence is highlighted by the mechanised mining that was carried out at the former Magna Egoli site (Figure 8) and the current artisanal diggings that are partly supported by an excavator to expose the basal gravels in the Ngarbena village area (Figure 9). The low terraces, being older than the modern Sewa River, have been affected by tropical weathering such that both the overburden and basal gravels are clay-rich (Figure 10), thereby making stripping of overburden more difficult as well as the treatment of the ore gravels themselves (Figure 9).

The unmined and partly-mined Sewa low terrace remnants (Figure 11) are earmarked for detailed mapping this coming 2015-2016 Dry Season whilst alternative water-based mining methods are being investigated by the Rock Forage consultants. In addition, grade and diamond data are being sought from old records (e.g. Hall, 1969) and local knowledge.

*Figure 8:* Section of a Sewa low terrace (double-headed arrowed) mined out by former Magna Egoli operations and now flooded under a perennial pool. Modern Sewa River in background beyond riparian forest fringe (single headed arrow).
Figure 9: Artisanal treatment of clay-rich basal gravels of the Sewa low terrace deposits. The overburden was stripped using an excavator and the basal gravels (arrowed) also mechanically placed onto an adjacent bench for later treatment as shown. Ngarbena village area.
Figure 10: Closer view of clay-rich basal gravels of the Sewa low terrace. Spade for scale.

Figure 11: Unmined and partly-mined Sewa low terraces will be mapped and then selectively targeted for grade and diamond population determinations in the Baja licence.
2.2 Kimberlite Potential

Core Geophysics (Pty) Ltd processed and identified 17 dyke targets and 2 alluvial targets with a high priority rating and a further 62 dyke targets, 4 pipe targets and 3 alluvial targets of lower priority. These are currently being reviewed, in combination with the mapping, stream sediment sampling and several mini-bulk samples taken earlier by GSR. Preliminary indications, including positive diamond recoveries from the Bawa stream mini-bulk sample (Figure 12), point to the north-west section of the Baja licence as having increased kimberlite potential (Figure 3).

![Figure 12: Four diamonds recovered from the Bawa stream during mini-bulk sampling exercise in the Baja licence.](image)

3 TONGO LICENCE (EL86/2011)

3.1 Alluvial Diamond Potential – Field Observations

The comparatively small (53 km²) Tongo licence (Figure 13) straddles the Woa River, the principal river draining the long-mined Penguma–Tongo alluvial diamond fields with east-north-east – west-south-west oriented diamondiferous kimberlite dykes (Hall, 1969; Stellar Diamonds, 2014).
Figure 13: The Tongo licence lies downstream from the main Panguma–Tongo kimberlite dyke fields that are cut by the Woa River. Alluvial deposits are found in the Woa Valley and in adjacent tributary valleys that are oriented east-north-east – west-south-west that may host kimberlite dykes.

The Woa River (Figure 14 and Figure 15) cuts across the strike of the main Tongo kimberlite dyke field upstream from the GSR Tongo licence. The main tributaries of the Woa in this zone are all diamondiferous and thus have contributed significantly to the alluvial budget in this trunk stream. In the uppermost reaches of the Tongo licence, GSR has commenced with testing the floodplain (flats) basal gravels of the Woa River (Figure 16) using excavator and dual Dove jig (Figure 17).

These basal gravels are relatively clean of clay and contain abundant cobble-sized clasts of resistant material, notably quartz and quartzite, some of which are particularly well-rounded (Figure 18 and Figure 19). Due to the onset of the Wet Season, the mini-bulk
sample has not been treated to completion but initial results are encouraging, returning
typical clear octahedral-shaped diamonds of clear quality with a good average stone size
(Figure 20). GSR will continue to acquire grade and diamond population data for the Woa
alluvials through mini-bulk samples as, to date, these data are insufficient for reliable
evaluations. Significantly, alluvial free gold has also been recovered from these floodplain
(flats) basal gravels of the Woa (Figure 21) and forms part of the alluvial investigation by
Rock Forage and the GSR Sierra Leone team.
Concomitantly, mapping of the narrow flats and low terraces will be updated in the coming
2015-2016 Dry Season downstream on the Woa where further potential is indicated by
the geomorphology (Figure 13).

![Crossing point on flooding Woa River, uppermost section of Tongo licence.](image)

Figure 14: Crossing point on flooding Woa River, uppermost section of Tongo licence.
Figure 15: Woa River in full flood, August 2015, in the uppermost reaches of the Tongo licence.

Figure 16: Part of the Woa floodplain (Flats) mini-bulk sample pit flooded in August 2015. Note Woa River (arrowed) in background.
Figure 17: Dual Dove jig, mothballed above the high-water Woa flood line for the Wet Season 2015, used to treat the mini-bulk samples taken by GSR.

Figure 18: Sandy, quartz-rich basal gravels from the Woa floodplain (flats) mini-bulk sample. Garmin62 GPS for scale.
Figure 19: Closer view of basal gravels from Woa floodplain (flats) mini-bulk sample. Note the combination of well-rounded resistant quartz clasts and locally-derived Basement clasts. Garmin62 for scale.

Figure 20: Initial diamond recoveries from the Woa floodplain (flats) basal gravels at the mini-bulk sample site. Note diamonds characteristic for the Tongo alluvial diamond fields father upstream and from the related Tongo kimberlite dykes. Scale in mm.
3.2 Kimberlite Potential

Core Geophysics (Pty) Ltd processed and identified 12 dyke targets, 3 pipe targets and 2 alluvial targets with a high priority rating and a further 25 dyke targets, 11 pipe targets and 3 alluvial targets of lower priority. These are currently being reviewed, in combination with the mapping, stream sediment sampling and several mini-bulk samples taken earlier by GSR. Preliminary indications, including artisanal operations, point to the northern section of the Tongo licence as having increased kimberlite potential (Figure 13).

4 MOA LICENCE (EL07/2012)

4.1 Alluvial Diamond Potential – Field Observations

The comparatively small (46.5 km²) Moa licence (Figure 22) just straddles the Moa River to the south-east of the Kambui Hills, an auriferous greenstone belt that constitutes a prominent roughly south-north trending series of hills and ridges. The stream sediment sample positions for kimberlitic indicator minerals and diamonds are also shown in Figure 22. However, due to the gold potential of the greenstone belt making up the Kambui Hills, this target will be followed first through a reconnaissance geochemical soil sampling programme.

The principal alluvial targets in the Moa River are expected to be the main channel (Figure 23), intermittent floodplain (flats) and low terrace deposits (Figure 24) although distance from known sources points to a potentially smaller average diamond size (also mentioned by Hall, 1969). The Moa River will be better assessed in the coming 2015-2016 Dry Season, although the alluvial diamond priority is likely to be sub-ordinate to the proposed reconnaissance gold exploration programme along the south-eastern foothills of the Kambui Hills and other bedrock outcrop areas in the Moa licence at this juncture. The
same techniques as for the Sewa and Tongo rivers, namely mapping of features, bathymetric surveys, possibly complemented by ground penetrating radar surveys, will be used to identify major trapsites in the Moa channel. The intermittent flanking floodplain (flats) and low terrace deposits will be mapped out once access is possible in the forthcoming Dry Season.

Figure 22: Moa licence to lying between the Kambui Hills, a greenstone belt, and the Moa River. The stream sediment sample positions for the kimberlitic indicator mineral and diamond sampling campaign.
Figure 23: The Moa is a substantial river in full flood and will be investigated in the coming 2015-2016 Dry Season by mapping and possibly bathymetric surveys.

Figure 24: Low terrace deposits flank the Moa River intermittently along its course.
4.2 Kimberlite Potential
Core Geophysics (Pty) Ltd processed and identified 2 areas of potential gold mineralisation and 3 alluvial targets with a high priority rating and 4 areas of gold potential gold mineralisation of lower priority. These are currently being reviewed, along with the results of the stream sediment sampling campaign for kimberlitic indicators minerals and diamond. To date, however, the kimberlite potential in the Moa licence appears to be limited.

4.3 Gold Potential
The encouraging results from the airborne magnetic survey with respect to potential gold mineralisation in the Moa licence has prompted Rock Forage and the GSR Sierra Leone team to initiate a reconnaissance geochemical soil sampling programme focussing on the south-eastern foothills of the Kamhui Hills (Figure 25). Some 20 samples are planned along the foothills with a further 30 samples associated with topographic highs throughout the Moa licence, west of the Moa River (Figure 26).

Figure 25: South-eastern foothills of the Kambui Hills range along the western margin of the Moa licence that have been identified for reconnaissance soil sampling programme for potential gold mineralisation.
**ZIMMI AREA**

From initial, preliminary observations on the diamonds from the Zimmi area, in particular the preponderance of fancy yellow dodecahedral forms (Figure 27) and the dearth of commercial white octahedral shapes, a different population to the Koidu-Tongo (Figure 20) type diamonds is seemingly evident. However, further work, including field follow up surveys, will be required to confirm these apparent differences and thus the implied, and as yet, undiscovered source(s) of the Zimmi diamonds.
6 CONCLUSIONS & RECOMMENDATIONS

From the initial, Wet Season site visit to the GSR licences of Baja, Tongo and Moa in south-eastern Sierra Leone, the following conclusions were drawn:

6.1 Alluvial Diamond Potential

Although diamonds have been mined for over 8 decades, and artisanal mining has been in force since 1950 (65 years), there is remnant potential in the more inaccessible placer deposits under thicker overburden of floodplain (flats), low terraces and/or deeper portions of the Sewa River in the Baja licence, the Woa River in the Tongo licence and the Moa River in the Moa licence. These residual alluvial targets, of which at least the Woa River also offers alluvial free gold potential, need to be mapped accurately and then prioritised for determining their diamond content (grade) and diamond quality (revenue).

It is recommended that a combination of bathymetric surveys, possibly complemented by ground penetrating radar surveys, and local knowledge (including historical mining records) be integrated to prioritise bulk sampling targets to determine grade and revenue. These approaches will be better used in the forthcoming 2015-2016 Dry Season.

Concomitantly, various mining methods need to be assessed, including robust dredging techniques and conventional excavator – earthmoving fleet combinations, to optimise extraction from potentially economic targets that may lie in sand-covered, boulder-rich basal gravels in main modern river channels and/or under thicker, clay-rich overburden overlying equally clay-rich, water-saturated basal gravels in narrow floodplain (flats) and low terrace deposits intermittently flanking the main river courses.

Figure 27: A sample of diamonds recovered from the Zimmi area. Note the fancy yellow stones. Scale in mm.
6.2 Kimberlite Potential

The comprehensive airborne magnetic survey flown over all three licences is currently under review and, together with the results from the initial reconnaissance stream sediment sampling campaign to recover kimberlitic indicator minerals and diamonds, will assist in prioritising follow-up sampling campaigns for kimberlite occurrences in the Baja licence (mainly north-western portion) and the Tongo licence (northern portion). The Moa licence appears to have limited kimberlite potential based on current data on hand.

6.3 Gold Potential

The potential for alluvial free gold in the basal gravels of the Woa River floodplain (flats) deposits needs to be assessed more critically. In the Moa licence, the presence of the Kambui Hills greenstone belt along the north-western margin of this licence commands more attention and a reconnaissance geochemical soil sampling programme has been planned for the remaining months of the 2015 Wet Season and into the forthcoming Dry Season.

7 COMPETENT PERSON STATEMENT

The information in this report that relates to the Exploration Targets is based upon information compiled by Dr John D Ward (Pr. Sci. Nat; PhD) who is an Independent Consultant employed by Rock Forage Mining Limited and is a Fellow of The Geological Society of South Africa. Dr Ward has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and the activity in which he is undertaking to qualify as a Competent Person under the 2012 Edition of the Australasian Code for Reporting Exploration Results, Mineral Resources and Ore Reserves (JORC Code). Dr Ward consents to the inclusion in a release of the matters based on his information in the form and context in which it appears.

8 GLOSSARY OF TECHNICAL TERMS

<table>
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<th>Term</th>
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<tr>
<td>airborne geophysics</td>
<td>radiometric mapping using airborne spectrometers used to map the concentration and distribution of radioisotopes near the Earth’s surface, which is useful for mapping lithology and alteration</td>
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<tr>
<td>alluvial</td>
<td>a mineral deposit made up of mobile sediment and/or soil</td>
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<td>amphibolite</td>
<td>a metamorphic rock consisting mainly of amphibole (group of generally dark-colored, inosilicate minerals, forming prism or needlelike crystals)</td>
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<tr>
<td>clast</td>
<td>a fragment of geological detritus often a chunk or a small bit of rock broken from an outcrop by physical weathering</td>
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<td>diamondiferous</td>
<td>containing diamonds</td>
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<td>dredging</td>
<td>excavation activity carried out partly underwater with the purpose of gathering up bottom sediments and extracting diamonds through pumping and screening on a barge</td>
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<tr>
<td>epidosite</td>
<td>highly altered epidote (calcium aluminium iron sorosilicate mineral) and quartz bearing rock</td>
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<td>exploration targets</td>
<td>The three exploration licenses held by GSR in Sierra Leone viz. Baja (EL87/2011), Tongo (EL86/2011) and Moa (EL07/2012) targeted for diamond and gold exploration</td>
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<tr>
<td>geochemical soil sampling</td>
<td>the study of the spatial variation in the chemical composition of soils at the surface of the Earth as an indicator of potential deposits of gold concentration</td>
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<tr>
<td>geomorphology</td>
<td>science of landscape form, shape or structure</td>
</tr>
<tr>
<td>greenstone</td>
<td>Archean (geological period before 2,500 million years ago) and Proterozoic (1,600-2,500 million years ago) volcanic–sedimentary rock sequences</td>
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<tr>
<td>heavy minerals</td>
<td>a suite of accessory minerals of a sedimentary rock or sediments having specific gravities greater than 2.9</td>
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<tr>
<td>indicator minerals</td>
<td>a mineral that occurs in association with ore minerals, or a specific type of rock; can be used to identify exploration targets</td>
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<tr>
<td>kimberlite</td>
<td>a rare, blue-tinged, coarse-grained potassic intrusive igneous rock sometimes containing diamonds</td>
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<tr>
<td>kimberlite dyke</td>
<td>a vertical &quot;sheet-shaped&quot; intrusive volcanic structure comprised of kimberlite</td>
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<tr>
<td>lateritic</td>
<td>soil and rock type rich in iron and aluminium, and is commonly considered to have formed in hot and wet tropical areas.</td>
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<tr>
<td>terrace</td>
<td>remnant of the former floodplain of a stream or river</td>
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<tr>
<td>trapsite</td>
<td>natural position of heavy mineral concentration</td>
</tr>
<tr>
<td>carat</td>
<td>standard measure of diamond weight (0.2grams)</td>
</tr>
</tbody>
</table>