ASX Announcement
ASX: BOE

14 August 2019

Passive seismic improves Honeymoon target generation

HIGHLIGHTS

- Passive seismic surveying provides Boss with greater geological understanding of channel structure and therefore more accurate targets for drilling additional uranium resource
- Survey method introduced at Honeymoon is a fast, low-cost, non-invasive geophysical alternative to assist in large-scale exploration of Boss-owned tenements
- Boss initially rolled out passive seismic surveys immediately adjacent to Honeymoon Mining Licence, which were then extended to all tenements to identify other palaeochannel systems
- Eastern Region surveys now complete over Exploration Targets 1 to 7, which have drill intercepts[1] from previous first pass drilling which include:
  - 0.3m @ 1,700 ppm U_3O_8 from 98.70m (Target 2, Jason's South) - 580-033
  - 0.5m @ 1,236 ppm U_3O_8 from 84.75m (Target 3, Yarramba) - SE012
  - 1.0m @ 1,437 ppm U_3O_8 from 105.50m (Target 4, Kalkaroo) - MTC056
  - 0.5m @ 1,112 ppm U_3O_8 from 124.00m (Target 5, Lawlor Dam) - YAM017
- Western Region survey results to be reported in Q4 2019

Boss Resources Limited (ASX: BOE) (**Boss** or the **Company**) is pleased to announce the initial results of low-cost regional passive seismic surveys completed over Exploration Licences EL5621 and EL6081 that surround its Honeymoon Mining Licence (ML6109 - Figure 1).

The passive seismic surveys, designed to cover Exploration Targets 1 to 7 (Figure 1), successfully confirmed the continuation of the narrower palaeochannel systems identified from the initial orientation survey (refer to June 2019 Quarterly Activities Report), while also providing information on how regional structural features have potentially influenced mineralisation in the palaeochannels.

Boss Resources Managing Director Duncan Craib said, "*While the Honeymoon Uranium Project has an existing Global Mineral Resource of 71.6 million pounds U_3O_8[2], the Company has commenced exploration to attain an additional Exploration Target. We are conscious of the low uranium price and the need to preserve cash, so we are trialling new, cost-effective exploration techniques for identifying additional, potentially mineralised, palaeochannel systems within our 100%-owned tenements.*

"The passive seismic surveys, which are a fast, low-cost, non-invasive and highly effective exploration alternative have returned exciting results from regional surveys, and this will allow Boss to generate

[1] *Refer updated Exploration Target announced to the ASX on 25 March 2019*
[2] *Refer updated Mineral Resource for Honeymoon Re-Start Area announced to the ASX on 25 February 2019*

Suite 23, 513 Hay St, Subiaco WA
P: +61 (8) 6143 6730
E: admin@bossresources.com.au
ABN 38 116 834 336

better quality, more focused target zones which in turn will allow smarter, more cost-effective design, planning and implementation of future drill programs."

Honeymoon Exploration Update – Passive Seismic Survey

The Honeymoon Uranium Project is approximately 80km northwest of Broken Hill, near the border of South Australia and New South Wales. The project is 100% owned by Boss Resources Ltd and covers an area of 2,600km^2, consisting of one granted Mining Licence, five granted Exploration Licences, three Retention Leases and two Miscellaneous Purpose Licenses.

Boss exploration has defined an initial suite of 10 Exploration Targets, five of which are in areas extensional to the existing Mineral Resources (Figure 1), and five which target geophysical anomalies, i.e. identifiable features on regional-scale geophysical data associated with known mineralisation elsewhere in the Honeymoon Project area.

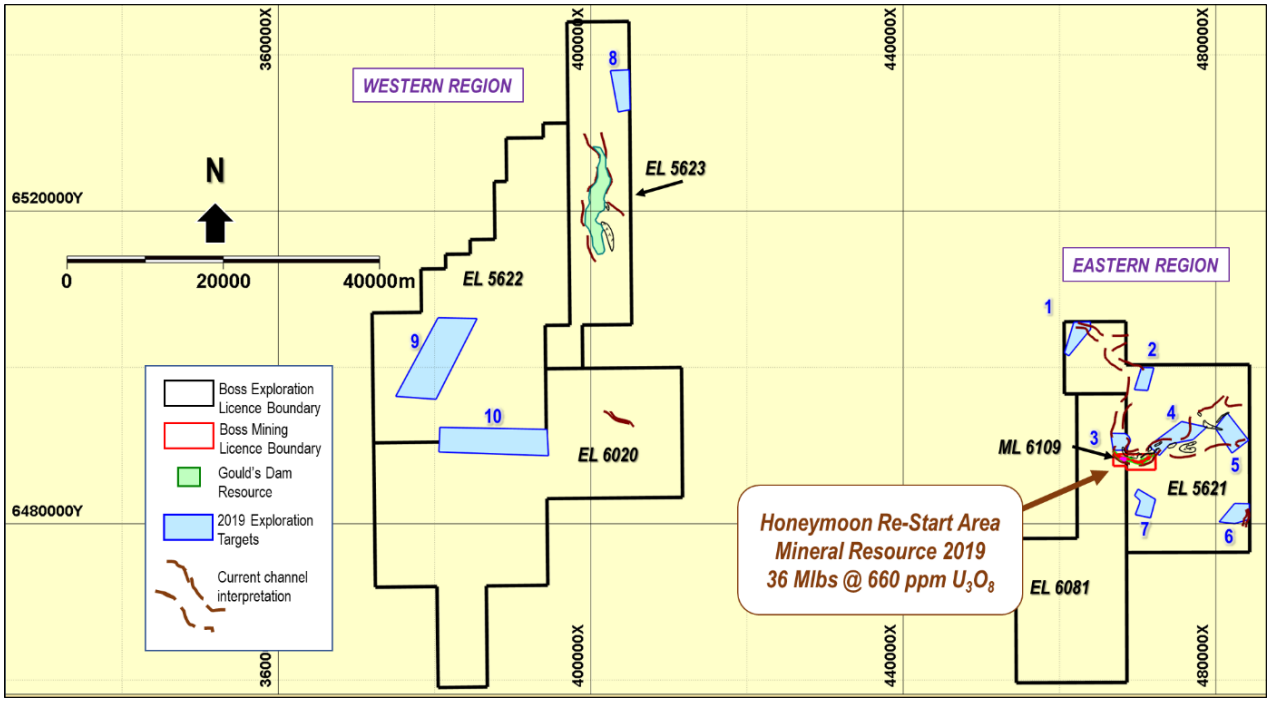


Figure 1: *Honeymoon Uranium Project Area, showing Exploration Targets 1 - 10*[3].

The Eastern Region contains Exploration Targets 1 to 7 (Figure 1), which were the focus of the passive seismic surveys recently completed. Survey lines were designed to coincide with the same promising historic drill results used for Exploration Target[3] estimation, including the following:

- **0.3m @ 1,700 ppm U_3O_8** from 98.70m (Target 2, Jason's South) - 580-033
- **0.5m @ 1,236 ppm U_3O_8** from 84.75m (Target 3, Yarramba) - SE012
- **1.0m @ 1,437 ppm U_3O_8** from 105.50m (Target 4, Kalkaroo) - MTC056

[3] *Refer updated Exploration Target announced to the ASX on 25 March 2019*

- 0.5m @ 1,112 ppm U_3O_8 from 124.00m (Target 5, Lawlor Dam) - YAM017

These intercepts could be potential indicators for thicker zones of mineralisation elsewhere in the channel systems. Some of the historical drilling (including the intercepts listed above) is situated at the edges of known deposits, implying that mineralisation remains open in multiple areas and supports the inclusion of these areas in the Exploration Target estimate.

Honeymoon's 2019 exploration program began with an orientation survey trialling the passive seismic method over an area of known drilling with the following objectives:

a) to assess its role in defining geological features important as vectors for mapping potentially commercial mineralisation; and
b) to create a deposit-specific, depth-to-basement model using geologically logged basement depths from historical drill holes, as detailed in the Company's June Quarterly Activities Report on 10 July 2019.

Part of this survey was also designed to extend beyond the northeastern boundary of ML6109 into Exploration Licence EL5621, and was chosen based on a) the existing drilling (also used to develop the basement model) and b) existing airborne electromagnetic data (AEM).

This survey aimed to improve resolution of the channel extents outside the known Mineral Resource. Figure 2 provides an image of the Eastern Region tenements (EL6081 and EL5621) covered by the AEM. The pale blue areas and thin, solid black outlines represent the palaeovalley boundaries as interpreted from the historical AEM data. Brown dashed lines are current channel interpretation from all existing drilling. The established Exploration Target areas (1 to 7) are shown as blue polygons overlying the AEM image.

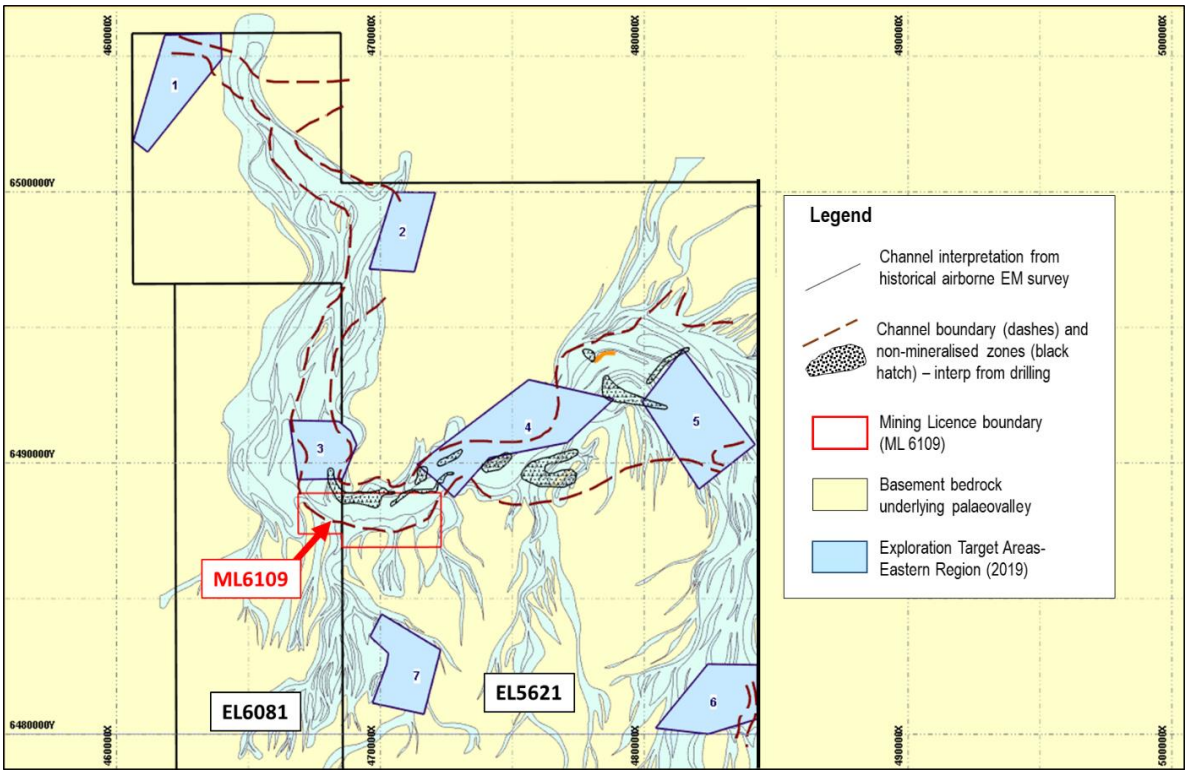


Figure 2: Honeymoon Uranium Project – Eastern Region. Historical (pale blue and black lines) vs recent (brown dashed lines) channel interpretations.

Figure 3 shows the resulting depth-to-basement model derived from the passive seismic orientation survey completed at East Kalkaroo. Brown dashed lines are again shown to represent channel interpretation from all existing drilling, while the black dashed lines represent channel boundaries as interpreted from the recent passive seismic results.

One immediate observation is that the passive seismic method has successfully constrained the boundaries of a narrower palaeochannel (~700 – 1,500m width) within the overall, much wider Yarramba Palaeovalley (~1,900 – 5,000m width). Dashed blue lines represent structural features and shallow basement "ridges" interpreted from the passive seismic results, some of which correlate well with structures interpreted from the AEM data (Figure 3). These structural features may have been the likely cause for various "jogs" and bends in the palaeochannel during formation, often providing ideal "traps" for significant mineral accumulations. This influencing factor is shown on Figure 3 by the coincident positions of mineralisation at East Kalkaroo (increased red zone near the northeastern boundary of ML6109), the interpreted fault structure and the modelled ridge of shallow basement. The interpreted structure to the northeast of the Mining Licence (top right of Figure 3) also correlates well with the edge of an area of shallow basement, as indicated by the passive seismic results and the bend in the channel as interpreted from existing drilling.

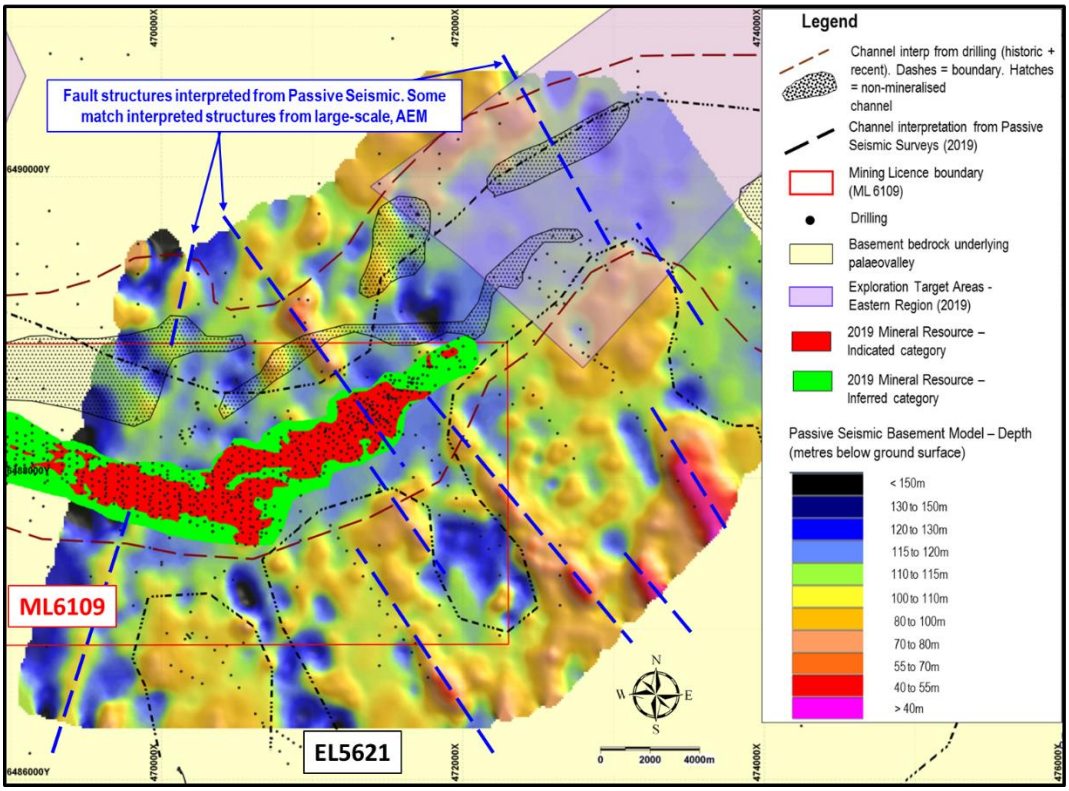


Figure 3: *Honeymoon Passive Seismic Orientation Survey. Passive seismic data shown as a gridded Depth-To-Basement model, coloured by depths below ground surface.*

Completion of Eastern Region Passive Seismic Surveys

Following completion of the orientation survey, Boss rolled out the passive seismic method on the Eastern Region areas with the following objectives:

1. To test potential extensions of the known mineralised palaeochannel both to the east and northwest of the Mining Licence,
2. To cover zones of interpreted structural complexity that influence channel morphology and mineral accumulations,
3. To test areas of anomalous cover sequence-sourced conductivity response from the historical, regional-scale, airborne EM (AEM) data,
4. To test the unexplored (and underexplored) parts of the overall Honeymoon Project with a particular focus on the 10 Exploration Target areas, for the purpose of identifying, or further defining, palaeochannel targets,
5. Identification and improved definition of palaeochannels which will improve drilling target generation and assessment by providing smaller and more focused areas over which drilling can be designed, and
6. Decrease the time and cost of defining targets and increasing the probability of discovery of new resources.

Passive seismic surveys designed to test Exploration Targets 1 to 7 in the Eastern Region tenements are now all completed (refer to Figures 4 and 5 for the resulting basement grids. Figure 4 shows the passive seismic results overlain on historical AEM data, along with historical channel interpretation (solid, thin, black lines), recent channel interpretation from existing drilling (brown, dashed lines) and current channel interpretation (black dashed lines) based on the newly-acquired passive seismic data. The extension of the mineralised palaeochannel hosting the Honeymoon Mineral Resource is clearly illustrated, providing the first exciting drill target area for future exploration drill campaigns.

The newly interpreted channel boundaries (Figure 4) also strongly support the initial, pre-program hypothesis that the passive seismic method would greatly improve channel definition within the region. Figure 4 shows this more clearly in relation to the position of the mineralised drillholes (black dashed lines for newly-interpreted channel boundaries and smaller coloured dots for drilling, respectively). The channel boundaries revealed by passive seismic are more defined than those from the drilling and AEM, with greater resolution showing the meandering, “pinch-and-swell” nature of the channel limbs, formed as it eroded its way through the harder underlying bedrock and preferentially followed, or was intersected by, faulted contacts in the basement.

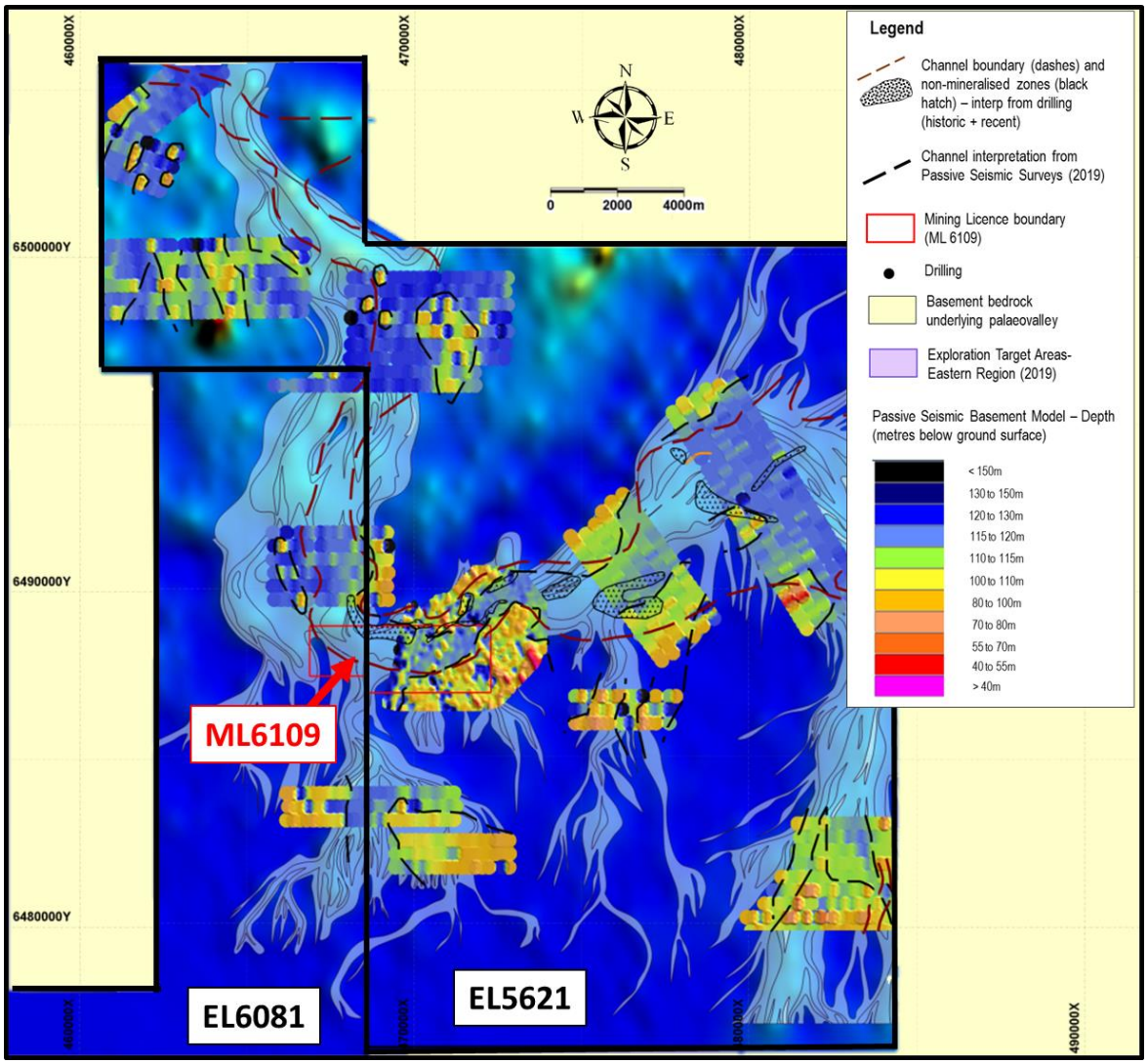


Figure 4: *Completed passive seismic survey results, overlain on regional-scale AEM data (depth slice from 90 – 95m depth below ground surface). Passive seismic results are shown as grids of Depths-To-Basement, coloured by depth below ground surface.*

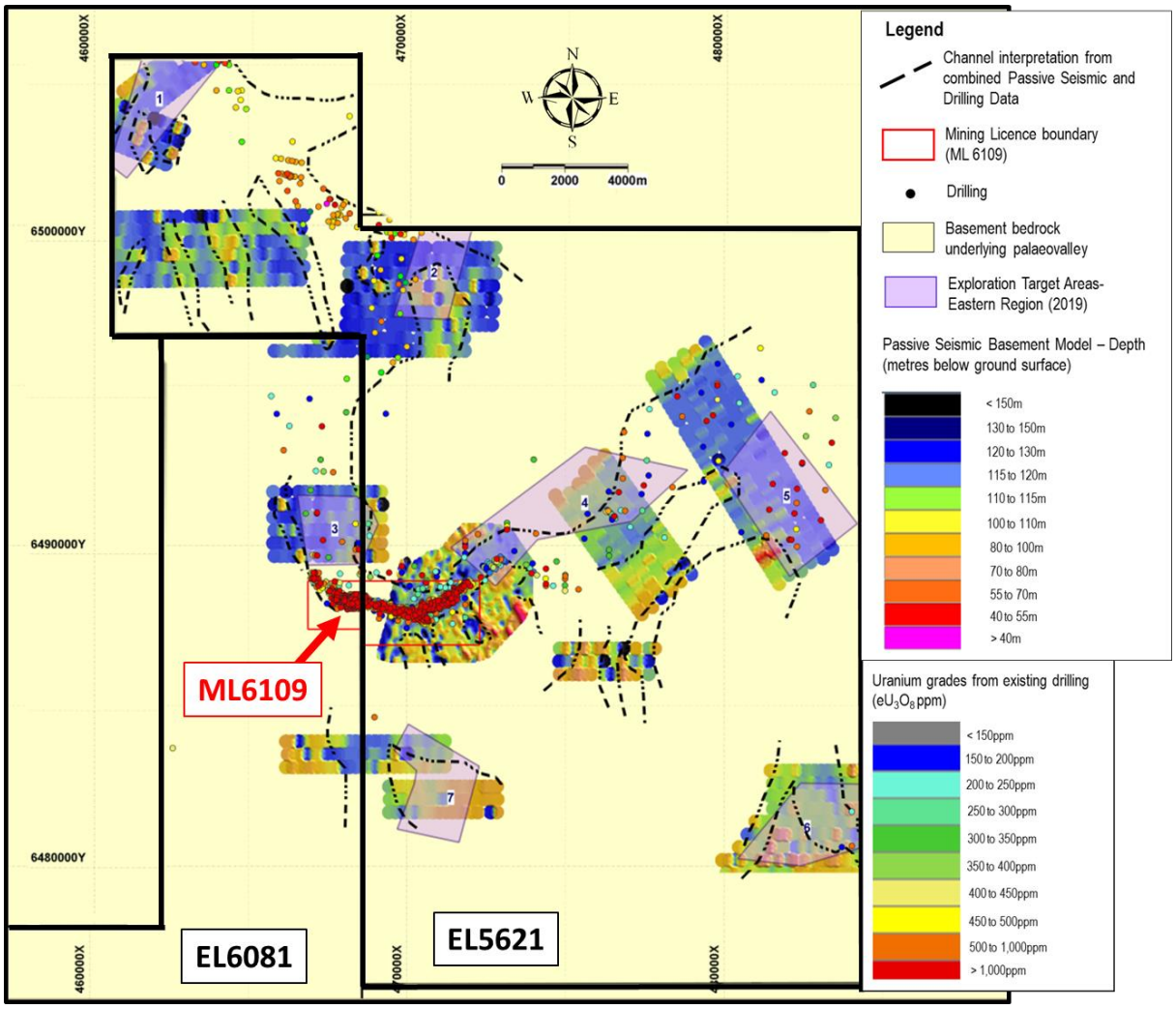


Figure 5: *Completed passive seismic survey results, underlying all existing drilling (coloured by uranium grade, ppm eU_3O_8, above a 150ppm cutoff). Passive seismic results are shown as grids of Depths-To-Basement, coloured by depth below ground surface.*

Results from the Eastern Region passive seismic surveys can be categorised into three main areas (refer Figures 2-5):

1. ***Northern drill targets –*** consisting of the Yarramba North (Target 1), Jason's South (Target 2), Jason's West (non-defined exploration target) and Yarramba (Target 3) prospects. Drill targets include three suggested, narrow channel limbs that have not been previously drill tested. These features appear to be parallel to, and share certain geological characteristics with, the known mineralised palaeochannel hosting the Jason's Deposit. Historic drill results suggest that mineralisation is still open to the southeast of Jason's, which correlates with the passive seismic results from Jason's South, indicating the extension of the Jason's channel system to the southeast, as well as a possible intersection by cross-cutting structures interpreted from the AEM data. The coincidence of features indicates a complexity in the channels that could also host economic uranium mineralisation.

2. *Central drill targets –* comprising the Kalkaroo (Target 4 and a non-defined exploration target area to the south of Target 4), and Lawlor Dam (Target 5) prospects. Survey results provided increased definition and confirmed the continuation of the currently known mineralised palaeochannel (hosting Honeymoon) into the eastern part of EL5621. These areas are high priority for future drilling programs as there is a strong possibility for additional uranium resource in the channel extensions within these parts. Results indicate "jogs" and bends within the channel systems that are known to host high-grade accumulations of uranium mineralisation within the Honeymoon Re-Start Area; and
3. *Southern drill targets –* consisting of the Kalkaroo South (Target 6) and Mundianna (Target 7) prospects. Passive seismic results indicate that narrower channel features appear to intersect the main Yarramba Palaeovalley, potentially confirming a long-held hypothesis of "feeder" channels bringing uraniferous fluids from the uranium-rich granitic basement rocks that outcrop to the south of the Company's exploration tenements. The sites of intersection between the various channel features could create mixing zones in which oxidised, uranium-rich fluids mix with oxygen-poor (i.e. reduced) sediments, creating the right chemical environment for uranium mineralisation to form.

Processing of the passive seismic data is occurring in-house, allowing Boss personnel to redesign the respective surveys, as and when required, during data acquisition. This process will be particularly useful during exploration in the southern parts of the tenements, where outcropping basement will render the passive seismic technique ineffective, as a result of the lack of a substantial thickness of cover sediments above the basement surface.

Key Findings and Initiation of Western Region Surveys

The passive seismic technique was introduced to the Honeymoon Uranium Project with the main objective of employing a low-cost, non-invasive alternative for smarter drill target generation, creating more focused drill target areas that would then allow for smaller, cheaper and more focused exploration drilling programs. The following key observations have been made from the passive seismic surveys completed thus far:

- Initial, pre-program hypotheses believed that there were narrower, mineralised channels within the much broader (between ~1,900 - 5,000+ m wide) Yarramba Palaeovalley. Passive seismic has successfully confirmed this theory by highlighting the presence of narrower channel systems (~700 – 1,500m width) that were not recognised in other geophysical datasets due to the high cost of achieving close-spaced resolution over smaller target areas;

- Survey data has confirmed the extension of the known mineralised Honeymoon channel system approximately 10km eastwards from East Kalkaroo into Exploration Licence EL5621, and northwards from Brooks Dam (on the western side of ML6109);

- Results from the Jason's prospects situated approximately 15km north of ML6109 also confirm that all of Boss' current Mineral Resources are hosted within the same, regional-scale channel system;

- Increased resolution of channel morphology has been shown by the identification of areas where the channels split into narrower limbs, e.g. at Jason's South and Jason's West;

- Increased resolution of structural complexity in the channel systems has been confirmed by the suggestion of linear features in the passive seismic data, which correlate well with previously interpreted structural elements from the AEM data. Structures are important for the creation of "trap" sites as they are often responsible for blocking the flow of groundwater, rendering the formation impermeable and resulting in the eventual precipitation of the uranium in-situ. This, in turn, potentially results in the formation of high-grade "pods" of mineralisation in the channels;

- The excellent correlation between both geophysical datasets is also coincident with the position of the bends and "jogs" previously observed in the larger palaeovalley. These particular zones are known in the region for containing economic accumulations of uranium mineralisation, making them highly prospective drill targets for future programs; and

- Historical interpretation of the AEM data recognised thin channel features intersecting the main Yarramba Palaeovalley. These features were thought to be feeder channels, allowing uraniferous groundwater from the uranium-rich granites, to the south of the Company's tenements, to enter the Yarramba Palaeovalley. The recent passive seismic surveys have confirmed this theory, revealing narrow channels that are thought to ultimately intersect with the east-west trending palaeovalley. The sites of intersection create mixing zones of oxidised, uranium-rich fluids and reduced channel sediments, providing ideal chemical conditions for the formation of uranium mineral accumulation, and may also assist in the explanation of high-grade "pods" of mineralisation that exist within the current Mineral Resource of the Honeymoon Re-Start Area.

The next scheduled surveys to be completed are in the Western Region tenements, beginning with Exploration Target 8 and the area immediately south of the Gould's Dam Deposit (labelled as Billeroo North and Billeroo South, respectively).

The Company looks forward to reporting on the exploration results from the second tranche of passive seismic once the Western Region surveys are completed in the last quarter of 2019.

For further information, contact:

Duncan Craib	Managing Director/CEO	+61 (08) 6143 6730
Nathan Ryan	NWR Communications	+61 (0) 420 582 887
Victoria Humphries	NWR Communications	+61 (0) 431 151 676

Competent Persons Statements

Exploration Results

The information contained in this announcement that relates to the Honeymoon Project Exploration Results is based on and fairly represents information provided by Ms Asha Rao, who is a Member of both the AusIMM and the Australasian Institute of Geoscientists (AIG). Ms Rao has sufficient experience that is relevant to the style of mineralisation, type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person, as defined in the JORC 2012 edition of the "Australasian Code for Reporting of Mineral Resources and Ore Reserves". Ms Rao has over 14 years of experience and is a full-time employee as Geology Manager for Boss Resources Ltd. Ms Rao consents to the inclusion in this report of the matters based on this information in the form and context in which they appear.

Mineral Resources

The information contained in this announcement that relates to the Mineral Resources on the Honeymoon Project were initially reported by the Company to ASX on 20 January 2016, 8 April 2016, 15 March 2017 and 25 February 2019. The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcements and that all material assumptions and technical parameters underpinning the estimates in the relevant market announcements continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcements.

Exploration Target

The information contained in this announcement that relates to the Exploration Target was first reported by the Company to the ASX on 25 March 2019. The Company is not aware of any new information or data that materially affects the information included in the announcement. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original announcement.

APPENDIX 2 – JORC TABLE 1, SECTIONS 1 – 2

JORC Table 1: Section 1 Sampling Techniques and Data

Criteria of JORC Code 2012	Reference to the Current Report Comments / Findings
Sampling techniques	Passive Seismic Survey Specifications: - Rental Contractor (for hire of instrumentation): Resource Potentials Pty Ltd - Instrumentation: Tromino TE3 – 0133 and Tromino TE3 - 0158 - Station Spacing: nominal 100m (average) for orientation survey and nominal 200m (average) for regional surveys - Survey Duration: 10 minutes - Sample Rate: 128Hz - Components: NS, EW, Z
Drilling techniques	Not applicable, no drilling conducted
Drill sample recovery	Not applicable, no drilling conducted
Logging	Not applicable, no drilling conducted
Sub-sampling techniques and sample preparation	Not applicable, no sampling or assaying conducted
Quality of assay data and laboratory tests	Not applicable, no sampling or assaying conducted
Verification of sampling and assaying	Not applicable, no sampling or assaying conducted
Location of data points	Passive Seismic stations were surveyed in using handheld Garmin GPS units. Datum used was GDA94, zone 54
Data spacing and distribution	Passive Seismic survey lines were spaced 100m (average) for the orientation survey conducted on Mining Licence ML6109. This line spacing was chosen for the initial orientation survey in order to: a) Determine the effectiveness of close spaced survey lines over the known mineralised channel; b) Determine whether or not this spacing could be later increased without losing resolution on basement topography in other areas of the Yarramba Palaeovalley Passive seismic survey lines for the regional surveys were spaced between 400m and 800m apart as this was considered adequate for mapping the strike extensions of the respective narrower channel systems within the broader palaeovalley.
Orientation of data in relation to geological structure	All survey lines were orientated perpendicular to the strike of the Yarramba Palaeovalley, as interpreted from historical geophysical datasets, such as airborne electromagnetic (AEM) data. Strike orientations vary between north-south to east-west, depending on the survey area in question.
Sample security	All field data was processed and interpreted in-house by the Boss Resources exploration department. Data was electronically transferred between the Honeymoon Uranium Mine (South

	Australia) and Boss Resources head office (Perth, W.A.) via a secure, password-controlled, Dropbox system.
Audits or reviews	All of the passive seismic data collected during the surveys has been reviewed by the Boss Resources Competent Person. No other audits have been completed.

JORC Table 1: Section 2 Reporting of Exploration Results

Criteria of JORC Code 2012	Reference to the Current Report Comments / Findings
Mineral tenement and land tenure status	The Project consists of 1 granted Mining Lease, 5 granted Exploration Licenses, Retention Leases and 2 Miscellaneous Purpose Licenses. The Mining license expires in 2023, exploration licenses expire in 2020 with the exception of EL 6020 and EL 6081 (expiry in 2019). All tenements are in good standing and are wholly owned by Boss Resources Ltd. A Native Title Agreement is currently in place with the Adnyamathanha, Ngadjuri and Wilyakali Traditional Owners. The Eastern Area of the Agreement provides 100% coverage over all tenements in the project area.
Exploration done by other parties	The Honeymoon deposit and surrounding areas of the Yarramba palaeochannel have been intensely explored and systematically drilled by different companies since 1969. The Honeymoon Project has been evaluated several times to varying degrees of intensity, from scoping studies to the current Definitive Feasibility Study that was initiated in 2018. Mineral Resource and Exploration Target estimates have been conducted at various times between 1998 to 2019 (Last Exploration Target estimate was announced to the ASX on 8 December 2015).
Geology	The mineralisation at Honeymoon is classified as palaeovalley-type, sandstone-hosted uranium in the form of tabular lenses which are associated with the vertical and lateral movement of oxidised, uraniferous groundwaters in palaeochannels that have likely been influenced by multiple regional-scale structures in the underlying basement formations. Mineralisation is hosted within the unconsolidated sediments of the Tertiary-aged (Palaeogene) Eyre Formation on what appear to be the shoulders, or shallow embankments, of narrower channel features within the palaeovalley. Channel fill consists of multiple upward-fining sequences of sand, silt and clay. Regional geophysical data show the coincidence between mineralisation of good grade and tenor from drilling and depressions in the basement topographic surface that are strongly suggestive of palaeochannel limbs. The mineralisation estimated in the Exploration Target is also associated with these same depression features, as interpreted from both airborne electromagnetic and magnetic data. In areas containing some drilling, data suggests that the mineralisation is also hosted within the same Eyre Formation sediments however, it is impossible to conclude that this is also the case for target areas that have not been previously drill tested.
Drill hole Information	The topography in the Eastern Region of the Honeymoon Uranium Project is predominantly flat. Details of the locations of the passive seismic survey lines are provided in the body of this report.
Data aggregation methods	The passive seismic data presented in this report is preliminary and requires further detailed processing and interpretation.

Relationship between mineralisation widths and intercept lengths	The passive seismic survey method maps the topographic surface of the underlying basement, highlighting depressions in the basement that are likely to be palaeochannels. This survey technique does not provide any direct correlation to potential mineralisation.
Diagrams	All of the appropriate and relevant diagrams have been included in the announcement.
Balanced reporting	As this data is preliminary in nature, only 2D plans and maps have been provided in this report. The remaining data are currently still being processed.
Other substantive exploration data	Existing exploration data over the Honeymoon Uranium Project is mostly historical and consists of airborne geophysical surveys and some drilling. Minor gravity surveys were completed in 2018 over parts of the Honeymoon Re-Start Area (Mineral Resource) and the Jason's Deposit (Mineral Resource), as orientation trial lines. Design work for both the gravity and recent passive seismic surveys involved acquisition of information from open file reports and governmental geophysical datasets (through the South Australian SARIG online portal (https://map.sarig.sa.gov.au/)
Further work	The Company intends to continue surveying using the passive seismic system over the designated Exploration Target areas in the Western Region tenements. Processing and interpretative work will also continue on the passive seismic data recently collected from the Eastern Region tenements.