CROWN

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Ms Catherine Myers
Chief Executive Officer
Victorian Commission for Gambling and Liquor Regulation
Level 3, 12 Shelley Street
RICHMOND VIC 3121

By Email

Dear Ms Myers

Sixth Review of the Casino Operator and Licence (Sixth Review) - Recommendations 7 and 8

I refer to Recommendation 7 and 8 of the Sixth Review and our response dated 2 July 2018.

Recommendation 7 provides:

> *The VCGLR further recommends that Crown Melbourne use observable signs in conjunction with other harm minimisation measures such as data analytics to identify customers at risk of being harmed from gambling.*

Recommendation 8 provides:

> *The VCGLR recommends that Crown Melbourne proceed with development and implementation of comprehensive data analytics tools for all patrons, to proactively identify for intervention patrons at risk of harm from gambling. These tools would utilise both historical data (with parameters developed from the second player model), and real-time monitoring of play periods. Crown Melbourne should look to models in other jurisdictions, and consult with external data analytics experts, with a view to implementing world-class, proactive approaches with real-time (or near-real time) operational effectiveness. In particular—*

> > *(a) for carded play (that is, player activity which can be systematically tracked), Crown Melbourne will have in operation a comprehensive real-time player data analytics tool by 1 January 2020, and*

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> (b) for uncarded play (that is, all other player activity), Crown Melbourne will, by 1 January 2019, commence a comprehensive study of all the practical options for a real time player data analytics tool, with a view to reporting in detail (including legal, technical and methodological issues) to the VCGLR by 1 January 2020 and the tool being in operation by 1 July 2022.

Executive Summary

In response to Recommendations 7 and 8, Crown Melbourne Limited (**Crown**) has undertaken significant work, including:

➢ The development of a data analytics tool for carded players (**members**), the 'Crown Model', to proactively identify opportunities for interventions with members who may be at risk of harm from their gambling. The Crown Model:

- Utilises historical data, applying a complex algorithm, which has been refined during extensive trialing conducted over a 12 month period;

- Appears, based on our trials, to be a more suitable tool for Crown when compared to other tools currently in use/available. Based on research undertaken, there is currently no third party technology available which meets Crown's requirements; and

- Has been endorsed by expert Professor Alexander Blaszczynski, in terms of the work performed to date, recognising that more time and data are now needed to progress the tool further.

The Crown Model is continuing to be operated in the same manner as during the trial, and is under continued review for refinement opportunities by both the Responsible Gaming Team and the Customer Analytics Team. It is proposed that Crown will also continue to have ongoing reviews carried out on the Crown Model by external experts.

➢ The development of a new real-time play period monitoring tool, which provides greater accuracy in reporting, allowing intervention at 12, 20 and 24 hours of continuous play. This tool is currently in full use at Crown, in concert with observable signs.

Therefore, in relation to the monitoring of carded play, Crown now has in operation a real time play periods tool in combination with a comprehensive player data analytics tool, which it is committed to developing and monitoring, to ensure it keeps or leads pace with alternate products in the market.

Please also note that specifically with respect to Recommendation 7, Crown has continued to use observable signs as a key element to its responsible gaming framework, together with the enhancement of its Play Period monitoring tool and the Crown Model.

With respect to the monitoring of uncarded play, despite extensive research, Crown has not yet identified any tools which are currently available (and importantly, proven) to effectively monitor uncarded play in Crown's environment, with a view to intervene with patrons who may be at risk of harm from their gambling. However, there are two pieces of technology which are currently under development, which Crown will continue to monitor closely. These are:

➢   Anonymous Player Awareness System (**APAS**); and
➢   Focal Research's EGM uncarded monitoring tool.

Based on the above summary, which is articulated further below, we are of the respectful view that Recommendations 7 and 8 have been addressed to the extent possible. Notwithstanding that a tool for monitoring uncarded play has not yet been identified; and that the Crown Model will continue to be refined over a period of time; the information contained within this submission confirms the commitment that Crown has in developing and implementing tools of this nature.

Crown Model

The Crown Model is Crown's data analytics predictive data-modelling tool, developed by Crown's in-house specialist resources. In developing the tool, Crown had the benefit of engaging with officers of the Victorian Commission for Gambling and Liquor Regulation (**VCGLR**) in order to obtain their feedback, for which we are grateful. Relevant background and detail regarding the Crown Model's development is outlined below.

To seek expert review and benchmark the Crown Model, as well as identify whether there was a more effective product in the market, Crown undertook research to identify a predictive data analytics tool, which is operating in a land based casino across both table games and gaming machines.

The outcome of this research was that there is currently no entirely suitable product which satisfies Crown's following requirements for a model:

a)   Utilises predictive data analytics;
b)   Applies to a land based environment;
c)   Incorporates both Gaming Machine and Table Games play; and
d)   Discloses its algorithm for peer assessment and independent efficacy testing.

Regardless, Crown was able to use information collated from this research to assess it against the Crown Model, to ensure we were implementing a suitable, proactive and industry leading product. Some examples of the models Crown reviewed include:

➢   The rule-based criteria Automated Risk Monitoring System (**ARMS**), in use at SkyCity Adelaide. However, it did not fit the criteria of providing data analytics or predictive modelling and its use for Crown's purposes were therefore discounted.

➢   The 'Playscan' product, a responsible gaming tool developed and implemented by Svenska Spel, a state-owned company operating in the regulated gambling market in Sweden. Playscan, as described in its publicly available information, incorporates a *'probabilistic risk prediction model ... [and] analyses player data to detect signs of problematic gambling'*, as well as limit setting and personalised player feedback (web based). It is mainly in use on Video Lottery Terminals in Sweden and Norway, as well as other gaming products and in France. However, there was no peer reviewed research available to confirm efficacy and Crown was unable to obtain any substantive independent indication of the usefulness of the tool.

➢   Focal Research, which has conducted research and developed a data analytics tool for land based carded play on Electronic Gaming Machines (**EGMs**) in Australasia.

Consultation with External Data Analytics Experts

Crown has carefully considered the research and Focal ALeRT ™ product, as the only entity to our knowledge conducting both research and developing tools for land based EGMs in Australasia. A number of presentations and discussions in relation to Focal's research and product offering took place throughout 2018 and 2019. This included a presentation of Focal ALeRT ™ to the Crown Resorts Limited Responsible Gaming Board Committee on 15 November 2018. These presentations and discussions with Focal Research were of great value to Crown, as Focal Research's use of data analytics in this area could be drawn upon when developing the Crown Model.

Although Focal Research's product, 'Focal ALeRT ™' is used for land based operator data analytics, it does not yet incorporate land based table games player data analytics.

We understand a report on the outcomes of a trial of a particular version of the product was issued in late December. We will review and consider the outcomes of this trial, and continue to monitor any progress in relation to the incorporation of table games play and assess its relevance to Crown.

We also note, for information purposes only, an earlier version of Focal ALeRT ™ was used by two provincial Canadian casinos, Casino Regina and Casino Moosejaw, Saskatchewan, Canada. Focal Research built and maintained the algorithms as part of the casinos' Responsible Gaming Programs iCare from the iView system. The algorithm was in place for nine years from 2005 but was discontinued in 2014.

In addition to the above, whilst there are a number of entities offering on-line gambling based player data analytics, none have converted to a land based product, and research has been silent on the potential cross over.

Crown will continue to monitor products in this area as they develop, with a view to benchmarking and improving the Crown Model as relevant, to ensure it is an industry leader in its class. In continuing the development of the Crown Model, Crown will continue to deploy the resources of the internal Customer Analytics Team, who are Crown's data analytics experts. The Customer Analytics Team are intimately familiar with the nature of Crown's business and members, and the data which is available for analysis.

Development of the Crown Model

In our respectful view, the development of the Crown Model, which includes both gaming machine and table games play, in the absence of a suitable market solution, was the most appropriate and effective action to take to address Recommendations 7 and 8, and most importantly, positively support our responsible gaming commitment (in conjunction with observable signs).

With helpful commentary provided by the VCGLR and the Victorian Responsible Gambling Foundation (**VRGF**) in terms of the baseline data, that is, largely the tracked play behaviours of members who subsequently self excluded, Crown proceeded with the development of the Crown Model.

Please find attached in **Attachment A** an outline of the development process of the Crown Model (as previously provided to the VCGLR), which included the analysis of 18 months of historical gaming data on 560 self excluded members to identify potential variables, which could be used in predictive modelling. Two-hundred variables were analysed, of which 50 were used to build the first models.

Once built, the models were subject to a validation process involving 559 self excluded members, and reached the stage where a live trial was required.

Consequently, a comprehensive trial was undertaken over a 12 month period from 25 June 2018 to 30 June 2019, in order to test and refine the effectiveness of the Crown Model. The details of the trial are articulated in **Attachment B**. Key aspects of the trial included the following:

➢ 9 tranches of 100 members each (ie 900 members in total) were provided to Responsible Gaming for review and action. Of these members:

- Responsible Gaming attempted to either interact with, or observe, the members when they next returned to the casino (132 did not return, based on loyalty card usage). There were 602 members interacted with/observed, and 15 self exclusions were entered into as a result of this process. The remaining 166 members were unable to be interacted with (due to, for example, having left the casino when the RGA attended, were in a group and a private conversation was not possible etc.).

- After interaction with Responsible Gaming, there were 258 subsequent interactions involving Responsible Gaming, relating to 76 members. These interactions were in response to play period monitoring, observable signs, welfare checks, Withdrawal of Licences, additional self exclusions, etc.

➢ 10 members, who had previously been interacted with, were randomly selected to complete a survey 7-8 months after their interaction, to collate qualitative data on what impact had been made. Of these 10, 3 members advised of a change in behaviour and 9 members indicated that the interaction was useful.

As has been the experience of the Focal ALeRT ™ product, the process and development of such a tool requires a great deal of time and agility and Crown is committed to the continued development of its tool that will assist (alongside observable signs, being a key component of our responsible gaming framework) in gambling harm minimisation.

To ensure the Crown Model was developed with the assistance of an expert, Crown consulted with Professor Alexander Blaszczynski, who was asked to review the Crown Model and comment on its merit. Upon review of the first quarter of Crown Model trial results, Professor Blaszczynski noted in May 2019 as follows:

> "In summary, [Crown's] Player Data Trial shows very promising preliminary results that the predictive algorithm can identify a subset of members exhibiting problems as evidenced by repeated contact with RGLOs (Responsible Gaming Liaison Officers), and that RGLO interactions between identified members is effective in moderating gambling behaviours as assessed by changes in visits, hours and ADT (Average Daily Theoretical) as compared to the control group. As a live trial over time, the predictive algorithm can be refined as more data and information is incorporated in the statistical model."

Following review of the Crown Model Trial Report presented in **Attachment B**, Professor Blaszczynski made the following additional observations:

> "I have reviewed the Crown Model Trial Report and concur with the views expressed that the development of a predictive model is dependent on the development of a large database with refinements resulting in further iterations of the Model. The Model has positive potentials...[it] represents an additional tool to assist in the identification of behavioural indicators of problem gambling."

The trial outcomes and Professor Blaszczynski's observations, albeit initial at this stage, have provided Crown with strong support that the Crown Model could be used as an additional tool to identify members who may benefit from intervention by Responsible Gaming, particularly when used in conjunction with observable signs. However, the Crown Model requires additional refinement and any machine learning product such as the Crown Model requires sufficient volumes of data and time to realise the success of the algorithm via validation and the impact an interaction may have.

Crown intends to continue to refine and develop the Crown Model guided by new literature as it becomes available, and in consultation with external experts in the field, the Customer Analytics Team and the Responsible Gaming Department. Crown will continue to run the Crown Model with periodic reports being analysed by the Responsible Gaming and Customer Analytics teams. Crown also proposes to carry out a detailed review of the Crown Model after a further 12 months of operation which will provide additional analysis and commentary on a broader data set and learnings over that extended period.

Play Periods Monitoring

Crown's real time monitoring, 'Play Periods', is a program that identifies continuous ratings without appropriate breaks during a 24 hour period. Members, using their loyalty cards and identified via Play Periods, are approached where possible by Responsible Gaming Advisors (**RGA**s) or Gaming Staff and reminded to take regular breaks. This program has been in place at Crown for a number of years, and was reviewed and significantly enhanced in 2018/2019.

Technology

Historically (prior to 2018), the method of identifying Play Periods was through SYCO (the loyalty program data collection system), in the form of automatically generated reports every four hours. These reports identified members who had over 12-hours of cumulative gaming activity but failed to take into account time on-site (e.g. the report would not capture a member with 11-hours of cumulative gaming activity over (for example) a 20-hour period).

In June 2018, following a review to identify more accurate technology to improve the functionality of Play Period monitoring, a program called 'Splunk' was identified as a viable option for reporting real-time Play Periods. *'Splunk is a software product that captures, indexes and correlates real time data in searchable form, from which graphs, reports, alerts, dashboards and visualisations can be generated.'*[1]

After initial discussions regarding the Splunk product and a period of analysis, verification and testing was conducted. A trial dashboard was then developed as a method of identifying members who had been on-site for more than 12-hours without a substantial break, based on their loyalty card use. Operationally, the trial dashboard was cross-referenced against SYCO reports, to test against the SYCO Report baseline and identify any discrepancies.

The trial was valuable in identifying the most appropriate parameters to provide meaningful real time data outputs, which could assist the Responsible Gaming Team in appropriately identifying

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[1] Obtained from Splunk website, accessed 13 November 2019, www.splunk.com/

members who had played for extended time-periods. Harm minimisation interactions were then able to follow (where possible). [2]

These harm minimisation interactions were purposed to inform members of their play behaviours for that period, discuss whether they have had sufficient breaks and whether they require any assistance from the Responsible Gaming Team.

In December 2018, Crown implemented the Responsible Gaming Splunk Dashboard v1.0 as the primary method for real-time monitoring of Play Periods and the existing 4-hourly automatic SYCO reports ceased.

By mid-2019, mobile Splunk alerts were implemented by Crown's IT Department, through the development of 'Webex Teams', which provided notifications to RGAs' phones, from the Splunk Dashboard. Following the success of the mobile Webex Teams notifications, the technology was further rolled out to gaming teams in late 2019.

A timeline of improvements made to Play Period reporting is shown in the below table:

Play Period Timeline	Commencement Date
Play Periods (time on device) commenced development using SYCO	July 2013
Splunk Dashboard Trial (time on site)	September 2018
Enhancement of Play Periods policy	December 2018
RSG Splunk Dashboard v1.0	December 2018
Webex Teams[3] Play Period alerts generated to PC and mobile telephones	April 2019
RSG Splunk Dashboard v2.0	August 2019
Webex Teams introduced to gaming staff to assist in monitoring Play Periods	October 2019

Interaction Policy and Process

The above mentioned improvement in technology has meant that the policy to intervene with a member has evolved, such that the more accurate Play Period reporting will result in a member being approached in the lead up to 12 hours on site (where the member's longest continuous break from gaming has been less than two hours). Previously, the manner in which the reports were generated meant that a member in this situation would be reported on and approached at 16 hours on site. This policy change occurred in December 2018.

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[2] Limitations to approaching members included where they had left the area before staff approached, where they were in a group and couldn't be drawn out without causing embarrassment etc.
[3] Webex Teams TM is an online collaborative tool that brings together messaging, file sharing *et al* to produce results faster, from the Cisco website accessed 17 November 2019 www.cisco.com

Specifically, the policy is applied as follows:

➤ The real time monitoring Play Periods program captures and alerts the Responsible Gaming Team based on various parameters, for example:

- A member in the lead up to the 12-hour mark (where the member's longest continuous break was less than two hours);

- A member in the lead up to the 14-hour mark (where the member's longest continuous break was less than three hours); etc.

➤ The Responsible Gaming Team then seek to undertake interactions with relevant members (either personally or through gaming staff).

➤ Further alerts are received and acted upon at a minimum at the 12 and 20 hour marks.

➤ Interactions post 20 hours, are conducted by the Responsible Gaming Team.

➤ Beyond 24 hours, members are asked to leave for a 24 hour period.

When developing the harm minimisation interactions, whilst cognisant of the positive outcomes that were to be expected from the enhanced real time tool, Crown took into account that some members:

➤ See interactions as interfering with 'their style of play';

➤ Actively avoid contact regarding Play Periods, i.e. not using cards at all or periodically only; and

➤ View RGAs as policing rather than supporting/educating.

Accordingly, careful consideration was given regarding the nature of the interaction to ensure that we had sufficient focus on the quality and timing of each intervention, which is crucial in terms of having meaning for the individual and their approach to their gaming behaviour. An intervention that occurs too early may be regarded as irrelevant by the member and there would be a loss of opportunity and impact in discussing Responsible Gaming issues. Any intervention needs to be purposeful, based on educating the member and alerting them to the potential problems associated with continued play. Knowledge and play history of members is significant, and where possible making use of this prior to any contact contributes to a meaningful, significant and targeted intervention with each member. All interactions are entered into the Responsible Gaming Register.

Uncarded Play Monitoring

As described in Crown's letter to the VCGLR, dated 24 December 2018, where Crown *advise[d] that it has commenced its study on exploring options available to it and will be assessing and analyzing the research and expert evidence available which supports a data analytics tool on uncarded play that may enhance Crown's responsible gaming framework.'*, Crown has undertaken this study, the results of which are provided at **Attachment C**.

In summary, to date Crown has been unable to locate an existing practical option for a real time uncarded player data analytics tool which is suitable for Crown's environment. However:

➤ A recent article[4] noted that the UK Betting and Gaming Council will introduce Artificial Intelligence technology called the Anonymous Player Awareness System (**APAS**). Although APAS again is only being applied to Gaming Machines, Crown will monitor its progress to determine if we can draw any learnings from it.

➤ Crown is aware that Focal Research is currently focusing on the development of a system that can identify gamblers of interest that are playing uncarded on an Electronic Gaming Machine. To date, no further information is available, however, Crown will to continue conversations with the Focal Research team.

Crown will continue to monitor new developments and look for solutions in the market, as well as liaise with its IT Department regarding bespoke options.

Conclusion

In our respectful view, Crown has undertaken significant work in order to address Recommendations 7 and 8. For ease of reference, the table below presents Crown's response to each element of the Recommendations.

Recommendation – Key Aspects	Crown's Response
Recommendation 7 ➤ Use observable signs in conjunction with other harm minimisation measures such as data analytics	Crown has continued to employ observable signs as part of its everyday responsible gaming practices. The Crown Model has been developed and refined over a 12 month comprehensive trial. The Crown Model is currently being used in the same manner as during the trial, in conjunction with observable signs.
Recommendation 8 1. Develop and implement comprehensive data analytics tools 2. Use historical data and real time monitoring of play periods 3. Research models in other jurisdictions 4. Consult with external data analytics experts	1. The Crown Model and improved Play Periods monitoring tools have been developed and/or enhanced and implemented. 2. Crown Model utilises historical data. Play Periods involves real time monitoring. 3. Research has been conducted and has not identified any suitable products. 4. Consulted with Focal Research, who are external data analytics experts, about how they were using data, which informed Crown's progress with the Crown Model.

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[4] https://www.gamblinginsider.com/news/8186/analysis-cool-off-system-needed-trialling-before-fobt-cut

Recommendation – Key Aspects	Crown's Response
Recommendation 8(a) Implement a real time player data analytics tool for carded play by 1 January 2020	Real time monitoring is currently conducted on member Play Periods, as described above. This complements the operation of the Crown Model which, given the need to run algorithms based on historical data in order to identify a member at risk, is not real time.
Recommendation 8(b) 1. Commence a comprehensive study of all practical options for real time player data analytics tools for uncarded players by 1 January 2019. 2. Report outcomes of the study by 1 January 2020. 3. Implement tool(s) by 1 July 2022.	1. The study of options for real time play data analytics tools for uncarded players commenced by 1 January 2019, as outlined in Crown's letter to the VCGLR dated 24 December 2018. 2. Outcomes to date are included in **Attachment C**. A suitable tool has not yet been identified. Crown will continue to monitor this. 3. The implementation of tool(s) by 1 July 2022 will be dependent on the ability to source an appropriate and effective tool prior to this date.

Please note that our response and the detail contained within it (including the attachments) **(Material)** contains confidential and commercially sensitive information. The Material is provided to the VCGLR in strict confidence for its sole and exclusive use in connection with Recommendation 7 and 8. It is the view of Crown that the Material provided is exempt from disclosure under the *Freedom of Information Act 1982* (Vic) under various sections of that Act. As such the Material must not be placed on any file, register website or database that is (or possibly is) available to the public. Please also note that Crown does not consent to the Material being disclosed to any third party whatsoever – whether under the Freedom of Information Act or otherwise – and the Material is made available strictly on this basis, and on the basis that no disclosure of the Material or any part of it be made without either receiving prior written consent from Crown or giving adequate prior notice to Crown in order that it may object to such disclosure.

Please do not hesitate to contact me or Joshua Preston, if you have any queries.

Yours sincerely

Barry Felstead
Chief Executive Officer – Australian Resorts

cc: Rowan Harris

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