



**Tennessee Lottery Corporation
Internal Controls Department
Interim Report to Audit Committee**

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EXECUTIVE SUMMARY

INTRODUCTION

The Internal Controls Department recently completed a review requested by the Chairman of the Audit Committee. The review was to investigate the implementation of the automated draw systems that the Lottery placed into service on July 28, 2007 which resulted in a software application error preventing repeatable numbers for the Cash 3 and Cash 4 games.

OBJECTIVES AND SCOPE

The objectives of our review include the following:

- Documenting the timeline of events;
- Evaluating the implementation process to identify who was responsible for the error, how the error occurred and why the error occurred;
- Evaluating the data obtained to conclude on the probability, if any, that the problem arose as a result of fraud, or if any one person profited from the error;
- An analysis/explanation for the delay in detecting or reporting the problem;
- Steps taken to prevent such an error in the future.

The scope of our audit included the following:

- Reviewing the correspondence from Smartplay and GLI;
- Meeting with TEL's Executive Officers to better understand the timeline and process followed;
- Meeting with TEL's Audit Committee Chair to better understand the approach for Internal Control's review;
- Interviewing TEL personnel to confirm the timeline and events that occurred or did not occur; and
- Obtaining and reviewing documentation to confirm the timeline and events noted during the review (i.e. phone records, phone logs, contracts, emails, purchase orders, RFP documents, correspondence, etc.).

BACKGROUND

On July 28, 2007, the Tennessee Education Lottery Corporation (the "TEL") began using two Origin automated draw machines from Smartplay International Ltd (the "Vendor") to select winning numbers for the TEL's CASH 3, CASH 4 and Lotto 5 games. The TEL had contracted with Gaming Laboratories International ("GLI") to evaluate the Origin system. The TEL received a verbal report of their certification and test results prior to July 28, 2007 and received their final report dated August 3, 2007 shortly thereafter.

On Tuesday, August 21, the Chairman of the Audit Committee of the Board of Directors (Committee) sent an email to the CEO/President of the Tennessee Education Lottery Corporation (TEL) requesting that Internal Controls conduct an investigation of all causes and effects of the problem encountered with the RNG system.

On August 24, the Vice President of Internal Controls and the Audit Committee Chair met with the Executive Management Team of the Lottery. The Executive Management Team outlined the issue with the automated draw machines (random number generators) and the steps taken to identify the problem and get the problem resolved.

ASSESSMENT

On April 9, 2007, the TEL posted the RFP to select a vendor for the random number generator machines (RNG). The evaluation committee established to review the RFP included TEL's CEO/President, TEL's General Counsel and EVP, TEL's CFISO, TEL's Security Information Manager, and an employee of WKRN-TV. This committee selected Smartplay International Ltd (the vendor) for the TEL's RNG vendor.

After the selection committee awarded the contract to Smartplay, the TEL created a task force to track the tasks which needed to be completed prior to the transition and implementation of the automated draw machines. This task force included TEL's General Counsel and EVP, TEL's Vice President of Information Systems, TEL's Vice President of Security, TEL's Security Information Manager, TEL's Network Support Services Manager, TEL's Special Events Manager, TEL's Vice President of Communications and an employee of Gish, Sherwood and Friends. The task list included steps such as:

- RNG Certification by Contractor – to be conducted from July 16 through August 3.
- Training by Smartplay – to be conducted from July 23 through July 27

The TEL's Audit Committee of the Board of Directors met on May 23, 2007, for a presentation by the vendor on their Origin System and what features and controls they had in place to maintain the integrity of the games. Based on that presentation, the Audit Committee agreed that TEL Management could pursue the purchase and implementation of the RNG machines.

TESTING AND TRAINING

On or around July 11th through 13th the Lottery sent the Data Center Operations Manager and the Data Security Manager to Smartplay's headquarters in New Jersey to train on and test the machines in order to draft procedures to be used by the operators and security personnel during the drawings and to perform functional tests of the modems, video servers and other administrative functions in order to draft administrative procedures.

The TEL had purchased services from Gaming Laboratories International ("GLI") to evaluate and certify the Origin system's hardware and software which included the RNG and primary draw application, and a verbal report was received prior to implementation on July 28, 2007. GLI's written certification report and test results received by the TEL were dated August 3, 2007.

The lack of double numbers occurred due to a coding error by a Smartplay programmer that was missed by Smartplay during its testing and during its review of the code. This coding error was also missed by GLI during its review and certification of the lines of code and during its testing of the machines. In a letter dated August 23, 2007, GLI indicated it used a test loop to call to the RNG and the parameters of the call to the RNG originated from different places in the program; the call to the RNG on the test code/loop had an "r" in it and the call to the RNG in the production code/loop had a "u". Therefore, double numbers were documented as appropriate and in normal range during the testing conducted by GLI and did not allow GLI to identify that there was a flaw.

In the response to our RFP, Smartplay stated it would train the TEL staff in Nashville and station engineers in all television stations. The RFP response stated "a thorough training seminar will be provided upon installation. We will leave your staff and studio engineers with a feeling of utmost confidence."

During the week of July 23rd, TEL's Security personnel worked with Smartplay personnel to install video servers at six television stations preparing for the first draw on the 28th. Then on July 27, two Smartplay representatives remained in Nashville to train the Computer Operations personnel, Security personnel and Internal Controls personnel on the operation of the Origin System. Internal Controls has reviewed the lottery's video of the training from July 27 and documented that the Smartplay "trainer" mentions the game specifications and how the game specifications were designed and where these can be viewed in the system. However, the video server screen is blank at the time and the trainer never instructs the class to review the game specs later.

Smartplay conducted the hands-on draw training using the checklist developed by the Data Center Operations Manager. At no time during the actual hands-on training did they suggest, instruct or refer anyone to the RNS video server screen for verifying the game specs nor did they instruct the Data Center Operations Manager to add this step to the checklist. Therefore, no one from Smartplay or the TEL verified the game specs. The only instruction received was to verify the numbers produced through the animation agreed to the numbers displayed on the video server screen.

The Smartplay personnel also referenced the Operation's Manual for the Origin System during the training and left a few copies on a table in the Data Center during the training classes. One of these copies was placed in a file pocket attached to Machine 2 for easy reference by the Draw staff.

IMPLEMENTATION AND INITIAL DRAWINGS

After training on July 27, the two Smartplay representatives remained on-site for the initial, midday drawing on July 28. Again, at no time during the pre-tests or the official (live) drawing for the midday drawing did Smartplay personnel suggest or refer anyone to verify the game specs as displayed on the video server screen, nor did they review the game specs as displayed on the video server screen. The draw checklist, however, instructed the draw team to verify the numbers produced through the animation agreed to the numbers displayed on the video server screen.

Both Smartplay representatives remained on-site for the evening drawing on July 28, and again, at no time during the pre-tests or the official (live) drawing did they suggest or refer anyone to verify the game specs, nor did they review the game specs as displayed on the video server screen. Again, the draw checklist instructed the draw team to verify the numbers produced through the animation agreed to the numbers displayed on the video server screen.

PROBLEM IDENTIFICATION

On or about August 3, 2007, the TEL's Communications Department began receiving website emails about concerns players expressed with the transition to the random number generator from the ball machines and/or about the lack of duplicate numbers in the official drawings since the implementation of the random number generator.

Based on information and data received from other lotteries that had received similar reactions from players when the transition was made to the automated drawings, Communications had a

'standard-type' of response that was given to the inquiries which talked about the integrity of the games with a brief description of how the RNG system was secure and how other RNG systems were used in other lottery games.

Also during this period, the Security Information Manager, as part of his ongoing job functions, was monitoring the results of each drawing to check for irregularities and as a result of this the TEL was aware that there had not been any duplicate winning numbers selected since the transition. The TEL had noted other extended time periods when duplicate numbers were not selected for more than one week, and therefore, determined to continue monitoring results.

By August 10 there were still no duplicate numbers selected in the CASH 3 or CASH 4 draws. TEL's CFISO completed a review of all winning numbers and upon his review the Executive Team of the TEL determined that they needed to continue monitoring the results and meet on the 13th to decide on a further course of action.

On August 13, the CFISO, General Counsel and Security Information Manager reviewed the winning numbers along with a report from GLI. The report indicated that all results were within the normal range consistent with the standard bell curve expected in games played with replacement such as in the case of CASH 3 and CASH 4. In an effort to confirm the report's results, a call was placed to GLI. While waiting for GLI, a determination was made to have the Security Information Manager test the system to determine if duplicate combinations could be achieved. The results of the chi-square testing performed by the Security Information Manager and the phone call with GLI confirmed that duplicate numbers could be achieved. Therefore, TEL made the decision to stay the course and continue monitoring the games' results.

On August 15, Executive Management discussed the possibility of having the Origin system recertified by an alternate vendor. Conversations began with other lotteries to ascertain alternate vendors with an expertise in this process. Also, game results continued to be monitored.

On August 20, the Security Information Manager contacted Smartplay regarding the concern of the winning numbers not producing any duplicate combinations. Smartplay reviewed their systems, and reported back to the Security Information Manager that a keystroke error in the application software program was detected. The coding error had established a "u" in the game parameters for CASH 3 and CASH 4 which made the numbers unique, and therefore, once selected for that draw, the number could not be selected again for that draw. The correction was made by the vendor and an update file (JAR file) was sent to the TEL around mid afternoon. Testing of the update file was complete and the correction applied in time for the evening drawings.

PROBABILITY OF INTENTIONAL ERROR

Internal Controls obtained a list of all individuals from GLI and Smartplay, who had access to the application program or were involved in testing and/or reviewing the programming code, to compare this list to winners of the CASH 3 or CASH 4 games as listed in the prize check register and paid by the TEL from July 28 through September 19. Based on this review of the prize check register, none of these individuals were paid as winners, nor did any name similar appear in the prize check register.

The CASH 3 game has 720 possible combinations that can be selected which do not contain duplicate numbers; and the CASH 4 game has 5040 combinations which do not contain duplicate numbers. Therefore, if a person knew that duplicate numbers were not possible and wanted to capitalize on this knowledge, he/she would have to purchase \$720 worth of CASH 3 tickets to guarantee a win of \$500. With the CASH 4 game, a player would have to purchase \$5,040 worth

of tickets to guarantee a win of \$5,000. Therefore, it appears unlikely that anyone benefited from the programming error.

PROBLEM RESOLUTION STEPS

For Players

For players who selected two or more of the same numbers in a play for CASH 3 or CASH 4 during July 28 through August 20 and who still had their tickets, the Lottery offered a double refund for the price of each affected play or two free plays equal to the value of the affected plays. This refund period began on August 22 and ended on September 13. Also during the 23 day period following the discovery of the problem, for those who played CASH 3 or CASH 4, the Lottery added additional cash to every prize.

Ongoing

The TEL also has contracted with KPMG Canada to perform an audit of the two automated draw machines for the Lottery with specified evaluation criteria of the hardware and software and to express an opinion on the conformity, in all material respects, of the machines based on the evaluation criteria and the machines' capability to generate winning numbers in a random manner in the appropriate ranges for the specified games. KPMG will also examine the randomness of the actual winning numbers generated by the automated draw machines since the CASH 3 and CASH 4 issue was resolved on August 20.

The TEL is updating their procedures to include testing of the application program for any and all program file updates made to the automated draw machines. The procedures and checklists are also being updated to include a review of the video server screen and confirming at each draw that the game specs are appropriately set.

CONTRIBUTING FACTORS

1. The chi square testing performed by the Security Information Manager only tests the RNG and not the primary draw application program.
2. From our review, TEL placed full reliance of testing the RNG and the draw application program on GLI and it appears no one at GLI adequately tested the draw application program, which is where the coding error occurred.
3. The Security Information Manager called GLI during the week of August 13, to confirm the results of its testing documentation. GLI indicated its test results confirmed that duplicate numbers could be selected.
4. In the response to our RFP, Smartplay stated it would train the TEL staff in Nashville and station engineers in all television stations. The RFP response stated "a thorough training seminar will be provided upon installation. We will leave your staff and studio engineers with a feeling of utmost confidence."
5. During on-site training of the TEL employees, Smartplay personnel described the game specifications and where they were displayed; however, they never instructed the draw team to review the game specifications but did instruct them to review the pre-test and live draw numbers as they appear on the video server screen to ensure they agree with the results reports.
6. Smartplay personnel had no hand-outs or other training materials during the on-site training. A copy of the Operation Manual was provided with the delivery of the machines and a couple of copies were left in the Data Center after the on-site training, but they were not used during the on-site training. Therefore, TEL personnel followed a procedural checklist drafted by the Data Center Operations Manager. At no time during this training, did the Smartplay trainer review or instruct the TEL employees to review the game specs. Nor did he instruct the Data Center Operations Manager to include a step for reviewing the game specifications.
7. Smartplay personnel were on-site for the inaugural draws and neither reviewed or instructed the draw team to review the game specifications displayed on the video server screen.