

Audit Report on the Thoroughbred Racing Associations' Y2K Totalisator Test

Prepared for: The Thoroughbred Racing Associations

Prepared by: John Walzak

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Introduction

In response to the North American racing industry's concern regarding the behavior of totalisator systems to the Y2K computer issue, the Thoroughbred Racing Associations (TRA) organized a test of three systems operated by the three major totalisator companies. I was asked to audit the results of the test based on my position as the chair of the Totalisator Standards Committee of the Association of Racing Commissioners International. Based on the material provided, I focussed the audit on two goals. The primary goal was to measure the behavior of the systems linked in a betting network via the Inter-Tote System Protocol (ITSP). The linking protocol was the focus of this part of the audit. The secondary goal was to measure the behavior of the individual tote systems during the test. System behavior, as evidenced by the reports produced, was the focus of both parts of the audit. I shall take this opportunity to offer special thanks to one of my students in the Race Track Industry Program at the University of Arizona. Mr. Ben Fletcher was invaluable in helping organize the reports and my thoughts for this audit.

The report is organized as follows:

1. Summary of findings
2. Structure of the Test
3. Audit Methods
4. Audit Findings

1. Summary of Findings

This audit does not identify any Y2K risk for ITSP or the named totalisator systems according to the structure and results of the test performed. In my opinion, the test is a reasonable approximation of actual betting networks that do not involve carryover pools. This feature was not tested.

Two caveats should be respected by readers of this audit. First, only the specified versions of ITSP were tested. Concerned parties should verify the ITSP version in use at their facility before considering the applicability of this audit to their operation. Second, only the specified totalisator system versions were tested. Again, concerned parties should verify the system in use at their facilities before considering the applicability of this audit. Regarding both points, the attached test scenario is, I believe, a reasonable structure for an independent test.

Finally, in personal communications with representatives from AmTote, Autotote and United Tote, all three companies stand behind the following statement, made before the results of this audit were known:

After conducting internal and external testing, the totalisator companies express complete confidence in their systems' Y2K compliance.

Concerned parties are strongly advised to contact their totalisator system vendor directly for information on how the above statement and this audit relates to the system in use at their facility.

2. Structure of the Test

The test was conducted on September 14, 1999. The sites were the AmTote hub at Calder racecourse, the Autotote hub at Belmont Park (NYRA), the Autotote hub at the Ontario Jockey

Club (OJC), and the United Tote hub at Churchill Downs. The AmTote hub at Thistledowns racecourse was scheduled to participate but did not, due to scheduling difficulties unrelated to the Y2K issue. These sites were chosen by the TRA in consultation with the tote companies. They represent typical hub operations, as well as four of the most used hubs in North America, in terms of daily betting data traffic and processing. Mr. Greg Bush, at Churchill Downs, acted as the test coordinator. Each hub acted as a Host track. Each hub, with the exception of the Ontario Jockey Club, acted as a Guest track for each Host's card. With the exception of Churchill Downs, the hubs were set to Eastern Daylight time. Churchill was set to Central Daylight Time. Versions 5.14 and 5.13 of ITSP were used. Three days of betting were simulated: December 30, 1999; December 31, 1999; and, January 1, 2000. December 30 established the baseline of network and system behavior. December 31 included a date roll-over, with all cards starting on December 31 and finishing on January 1, 2000. This scenario was designed to measure response to New Year's Eve operations. January 1, 2000, measured opening and operating a full card with the year 2000. Each system operated with its normal operating parameters for functionality and reporting. A copy of the test scenario, including ITSP versions in use, race cards, pool profiles and testing procedures, is attached as Appendix 1. A listing of reports produced by each system, including an equivalency of data in each across tote systems is also included.

Totalisator companies identify their systems by version numbers. The version numbers for the systems involved in the test are:

AmTote: 7.7.3.

Autotote: 96 – A .01.

United tote: Master V4.02.03.

The version number appears on the top of every report printed by the AmTote and United Tote systems, and on the console log of the Autotote system.

A set of system reports and the tickets and vouchers from each system for each day were collected. The AmTote and United Tote systems did not sell any vouchers on any day.

3. Audit Methods

All reports, tickets and vouchers were organized by Host, by day, by race, and by system. December 30, 1999, was used as the baseline against which the other days were compared. Information and processes were compared and checked among systems against the baseline. The audit had two foci: the behavior of ITSP in the network; and, the behavior of individual systems.

3.1 ITSP Audit Methods

System initialization logs and reports were compared for protocol version in use, race card information transmitted by the Host, pools transmitted by the Host and Guest, race results transmitted by the Host, and pay-outs transmitted by the Host.

3.2 System Audit Methods

System reports, tickets and vouchers were compared for the December 31, 1999, date rollover during the cards, the January 1, 2000, date initialization and operation, the calculation and processing of pay-outs, the cashing of winning tickets and live vouchers, the carryover of outs books, and the cashing of outs tickets.

4. Audit Findings

There are three parts to the audit results: a review of the materials provided, the ITSP audit, and the system audit.

4.1 Review of Materials

No documentation from the Autotote OJC system was provided. It is my understanding that a commentary on this material is available from Autotote and the Canadian Pari-Mutuel Agency. No commentary is provided in this report concerning the OJC system. Evidence from reports and logs produced by the other three systems concerning the operation of the OJC system was taken as prima facie evidence of race information, pools, race results and pay-outs processed by the OJC system.

No tickets were provided from the AmTote Calder system. It is my understanding, from telephone communications with AmTote representatives, that tickets were held back because they represented live transactions on the test system. The Transaction Print Report from each day was used to verify bet and cash transactions.

The AmTote Calder Price Report for all January 1, 2000, cards contained information from the December 31, 1999, cards. This was apparent from the dating on the reports as well as from a comparison of the information reported. AmTote representatives attributed this to operator error. Correct versions of the report were generated from the test day's log tapes and forwarded. Dates and information were as expected.

The Autotote NYRA system experienced operational difficulties during the start of the December 31, 1999, test scenario. Autotote and NYRA representatives, during telephone communications, attributed this to operator error due to conditions at the hub unrelated to the test. As a result of these difficulties, no link was made and no bets were sold on the first three races of the OJC card. While version ITSP 5.14 was scheduled in the test scenario for this link, a review of the logs showed that the link was eventually made through version 5.13. Any information about the first three races at the OJC and reported by the Autotote NYRA system was ignored as irrelevant to the audit. The review of the log, reports and tickets confirmed that no bets were sold. Further, these difficulties resulted in a problem transmitting the pools for the first three races at Calder. The pools could not be transmitted in time to meet the schedule for the test at the other sites. These bets were refunded. The proper ITSP link was made and the Host transmitted the proper race card information. This, along with the refund, was verified through a review of the log and the reports.

The Autotote NYRA system did not initially provide a Transaction Report for any of the days. Cashing of tickets was verified by reviewing the actual tickets for the cashing print marks, and by matching tickets to the Outsbook Ticket Report, and the Cashed Tickets Report. Autotote and NYRA representatives agreed to forward copies of the missing reports generated from the test day log tapes. Upon receipt, tickets were verified against the reports for selling and cashing.

It is my view that these errors and omissions, coupled with explanations from appropriate representatives and the production of appropriate reports, do not significantly impact the findings of the audit.

4.2 The ITSP Audit

ITSP defines the information concerning the races, pools, runners and calculations concerning the Host's races that the Host transmits to each Guest. It also defines the information concerning the amount bet in each pool and on winning outcomes that the Guest transmits to the Host where the merged common pool is created and calculated. No information about individual bets is included in these definitions and transmissions. I believe that the ultimate test of the effectiveness of the protocol is that the Host successfully links with each Guest, that each Guest offers the betting options with the parameters defined by the Host, and each system processes the same Host-defined -pay-outs. These were the guide-posts of the audit.

For all three days, with one exception, there is evidence that the Host successfully linked with the Guest using the ITSP version specified in the test scenario. The exception is the Autotote NYRA system problem described above. In that instance the evidence suggests version 5.13 of the protocol was used when 5.14 was expected. That instance also showed evidence of the Guest system having different pools than the Host, and the Host refusing to link until a correction was made at the Guest. This is to be expected in the normal operation of ITSP. Further, the evidence shows each Host correctly identifying each Guest, and vice versa. System Initialization Reports and logs were the source of this evidence.

The aforementioned reports and logs also showed evidence of the Host's transmission of the race and pool configuration for its card. This evidence was verified as having been implemented by each Guest through a review of each system's Pre-Betting Reports. All systems were configured the same.

Pay-outs were checked by reviewing AmTote's Price Report, Autotote's Prices Report, and United Tote's Price Liability Report for each race. In addition, Autotote's log showed the Host's result and pay-out messages. All sources, for the races on which bets were made, had the same result and pay-out information (Note: Autotote NYRA was not checked for the three races missed on Dec. 31, 1999, from the OJC and Calder Hosts).

With special regard to the Y2K issue, all systems successfully maintained the link during the December 31, 1999, cards when the actual date changed to January 1, 2000 for the Host as well as for the Guest. All systems successfully linked and exchanged the appropriate information during the January 1, 2000, test cards.

It is my opinion that ITSP, versions 5.13 and 5.14, does not pose an identifiable Y2K risk when implemented with the tote systems tested.

4.3. The Systems Audit

The secondary goal of this audit is to measure the behavior of totalisator systems in a Y2K test scenario. Totalisator systems are complex computer systems. I believe that the ultimate test of effectiveness of a totalisator system is that it sell bets correctly, calculates and pays winners correctly, reports the time correctly, reports outstanding bets correctly, and pays outstanding bets correctly. These were the guide-posts of the audit. Only materials provided were considered in this part of the audit. No personal communications or experiences were considered.

Evidence of correctly selling bets was obtained from each system's pool summary reports for itself and for the network. In addition, individual tickets were examined and compared to the pool reports. The tickets and pools matched the test scenario, with refunds/cancels supported by the actual ticket and the reports. Randomly chosen individual tickets were matched to ticket logs. Particular review was given to bets made during and after the December 31, 1999, date rollover during betting operations. All bets were reported as expected. All systems agreed on pool and runner totals.

As mentioned above, all systems matched pay-outs. These pay-outs were not recalculated in the audit. Randomly chosen and selective winning tickets and bets were selected from the December 31 and January 1 cards. The selective winning tickets and bets were on the December 31 cards and represented bets made before the date rollover and cashed after. For each of the audited winning transactions, the correct total pay-out was manually calculated based on the pay-out information reported by the system. Transactions were matched to the serial numbers reported in AmTote's Transaction Print Report. This report also contained evidence of a voucher sold on December 31 and cashed on January 1. All selected cash transactions for this system were correct. For the Autotote system, the selected tickets were matched to the serial

numbers in the Transaction Audit Tape Report and the Cashed Tickets Report. All selected transactions for this system were correct. For the United system, the selected tickets were matched to the serial numbers in the Ticket List and Terminal Log reports. All selected transactions for this system were correct.

Evidence of correctly reporting time was obtained from the reports and tickets provided. All reports from all companies show the time and date produced. All correctly showed the proper time during the date rollover on the December 31, 1999, cards. All showed the proper date and time for the January 1, 2000, cards. AmTote reported the date of the start of the card being reported, the actual time, and the date the report was produced. Time was reported according to the 24 hour clock, and the date rollover was shown by the clock reporting the time starting at 0.00.00. This system accurately and consistently reported the dates and time for the test scenario according to its method. Autotote reported the date of the start of the card being reported and the actual time. Its tickets carry the same date format, including a branding of the date of the card during which they were cashed. Time was also reported according to the 24 hour clock, and the date rollover was shown by the clock reporting the time starting at 24.00.00 and progressing forward through 25.00.00, etc. This system accurately and consistently reported the dates and times for the test scenario according to its method. United Tote reported the date of the start of the card being reported, the date of the report and the time of the report. Its tickets carry the same dating format, including the cashing receipts produced. Time was reported according to the 12 hour clock, with A.M. and P.M. noted. The date rollover was reported with the clock beginning at 12.00.00, A.M. This system accurately and consistently reported the dates and times for the test scenario according to its method.

The last aspect of the audit was the processing of outstanding winning bets. This type of bet represents winning bets that were not cashed during the card for which they were sold. Totalisator systems must track these bets and cash them when presented by the patron. The audit focussed on verifying the carrying over and cashing of outstanding bets on January 1, 2000. The same random and selective choosing of outstanding bets and pay-out confirmation was performed as described above for each of the first two days of the test scenario. The AmTote system showed evidence of correctly recording outstanding bets and cashing of such bets according to a review of the Transaction Print Report. The Autotote system showed evidence of correctly recording and cashing of such bets according to a review of the Outsbook Ticket Report and Cashed Ticket Report. Actual tickets were compared with these reports. The United system showed evidence of correctly recording outstanding bets and of such bets according to a review of the Group Outs Summary and Terminal Report. Actual tickets were compared to these reports.

It is my opinion that none of the three systems as tested pose an identifiable Y2K risk.

APPENDIX 1

Y2K Tote System Compliance Test Package

We would envision that each Tote system would conduct its own in-house test that would include, if applicable, telephone account wagering, on-track accounts, etc. This test would be a communications test between the various tote companies in which each system would be a Host and Guest. The test would be a simulation of three days, December 30, 1999; December 31, 1999; and January 1, 2000. The December 31 card would roll over into January 1.

Instructions

1. Instruct Tote Operators to set up tote system with the date Thursday, December 30, 1999.
2. Enter 3 identical race cards, see attached, using Host Track I.D. Each tote system will link and download the other systems race cards.
3. Enter wagers for all pools on Race Card #1, December 30 and wagers for all pools for Race Card #2, December 31. Prior to the Tote System rolling over to January 1, 2000 you must: calculate complete race card for Race Card #1 and perform End of Day operations; then calculate races 1, 2 and 3 for Race Card #2. Cash tickets from Card #1 and #2 in races #1 and #4, include refund tickets from Race # 4.
4. After the tote system date turns over to January 1, 2000, price the remaining 3 races on Card #2. Check to ensure the date has rolled over on tote system, tote system logs, tickets, vouchers, TAB accounts, Self Serve and Teller terminals, TAB daily accounts, exchange rates, teller balance reports, site reconciliation reports, pool matrixes, liability reports, price reports, commission and breakage reports. Check TAB and Account wagering PC's and voice recorder for PC's for both TAB and Account wagering for correct date.
 - Report Terminology (attached) for Tote Companies lists all reports available by Tote Company. Request a copy of each report listed and ascertain that each is still available, accurate and dated correctly.
 - Cash tickets from Card #1 and Card #2 for races #2 and #3. Request and verify Day End Reports.
5. Ask for Outs Book for December 31, 1999. [At OJC only: After Tote Operator performs End of Day on Card #1 and Card #2 request a download for both cards - compare the two downloads. They should be identical.]
6. After End of Day is completed bring Tote System back up as start of day for Saturday, January 1, 2000. Check for correct date on tote system, system logs, TAB PC and voice recorder, account PC, operator terminals, self-service terminals and teller operated terminals. Enter Race Card #3 from Race setup and enter pool loads for card. Check to see that Vouchers and tickets have correct date and information.
 - Request ticket history and account statements from December 31, 1999 TAB and Account betting accounts. Check to see if accounts were updated and credited properly.
 - Ask for Outs Book from December 31, 1999 and compare Outs Book obtained from Tote previously. Both should be identical.
7. Cash tickets from Card #1 and Card #2 to ensure system recognizes serial numbers, outs and pay out through system for tickets from December 31, 1999.
 - Refer to Report Terminology - Verify that all listed reports are available and dated correctly
8. Cash tickets from Card #3. Verify that TAB and Account Wagering accounts have been updated by system. Request and verify Day End Reports.
 - Request a download for Card #3. Download for Card #1, #2 and #3 should be the same.
 - Request Outs Book for January 1, 2000 and verify that winning ticket are recorded correctly.

9. Account Wagering

- Take a tape from 2 - 3 months previous and see if data can be accessed.
- purging accounts, if an account was previously deleted prior to rollover, ensure it remains so.

REPORTS:

	United Tote	Autotote	Amtote
Pre-Betting Reports			
Date, time, software version	on all reports	on all reports	on all reports
Legal deductions	Server Configuration Report	Commission Table Report	Commission Percentage Report
Runners, entries, scratches	Race Card Report	Event Report	Pool Definition Report
Pool profiles for each race	Race Card Report	Event Report	Pool Definition Report
Gross or net pricing	Event Configuration Report	Event Report	Commission Percentage Report
Itb sites	Run Evaluation Report	Event Report	Commission Percentage Report
Commission tables for itb's	Server Configuration Report	Event Report	Commission Percentage Report
Cancel delay	Event Configuration Report	Association Database Rept	Community Option Report
U/p & overages added	Race Card Report	Pool Total Report	Add In Report
Carryover/splits-split pools	Race Card Report	Carryover Database Rept	Add In Report
Exchange rate \$US	Server Configuration Report	\$US EXCHANGE REPORT	Exchange Rate Report

Race by Race Reports			
Pool totals by runner	Pool Distribution Report	Top Calc Report	Pool Print Report
Prices	Price Liability Report	Prices Report	Price Report
Net pricing (multi-site)	Price Worksheet	Pool Prices Report	Price Calculation Report
Legal deductions	Commission distribution	Comm.&Breakage Summary	Liability Summary Report
Amount paid out/breaks	Pool Liability Report	Price Report	Liability Summary Report
Amount refunded	Pool Liability Report	Prices Report	Liability Summary Report
Odds progression	Odds Report	Cycle Odds Report	Odds Progression Report
Scans	Scan Report	Pick ? Scan Table Report	Scans Report
DD/Pick will pays	Will pay report	Will pay report	Will pay report
End of Day Reports			
Amount bet by pool	Pool Liability Report	Prices Report (Last Page)	Pool Summary Report
Amount bet by site	Group Liabilities Report	Community Sales Report	Liability Summary Report
Legal deductions	Group Comm Distribution	Assoc. Commission Summary	Liability Summary Report
APO/Breaks	Pool Liability Report	Prices Report	Liability Summary Report
Amount refunded	Pool Liability Report	Prices Report	Liability Summary Report
Special Reports			
Ticket history	Ticket List Report	Transaction Report	Bet Display Report
Terminal history	Terminal Log Report	Transaction Report	Bet Print Report
Outstanding tickets	Outs Summary Report	Daily Outs Balance/Outs Ticket	Out Summary Report
Teller balances	Sales Summary Report	Tellers Balance Report	Agt Balance Report

RACE CARDS:

Race Card for Y2K Tote System Compliance Test

Race #	Runners	Entries	Pools	Order of Finish	Post Time Favorite	Scratch
1	1-10		WPS, EX, TRI, QU, DD, P6, SPR	1-2-3-7		
2	1-10		WPS, EX, TRI, P3	2-3-4		
3	1-10	1, 1A	WPS, EX, TRI	1--5-1A-2		
4	1-10		WPS	6-5-4	1	2
5	1-10		WPS	5-8-6		
6	1-10		WPS 3	3-7-4		

POOLS

WPS	RUNNER	WIN	PLACE	SHOW
	1	52	52	52
	2	12	12	12
	3	30	10	10
	4	35	15	15
	5	30	10	10
	6	30	10	10
	7	15	15	15
	8	17	17	17
	9	17	17	17
	10	17	17	17
Total :		\$255	\$175	\$175

Quick
 \$10 WPS ALL (1-10)
 \$40 WPS #1
 \$20 WIN #3,#4,#5,#6
 \$5 WPS #4, #7
 \$2 WPS #1, #2
 \$7 WPS #8, #9, #10

EXACTA Races 1-3

\$10 ALL / ALL	\$900
\$5 Box 1,2,5	\$30
\$4 Box 1,2,3	\$24
\$2 Box 1 thru 6	\$60
Total :	\$1,014

TRIFECTA Races 1-3

\$4 ALL/ALL/ALL	\$2,880
\$2 Box 1,2,3,4,5	\$120
\$2 Key 1,2 with 1,2,3,5 with 1,2,3,4	\$28
\$10 Box 1,2,5	\$60
Total :	\$3,088

QUINELLA Race 1

\$10 ALL/ALL	\$450
\$20 1,2	\$20
\$5 Box 1,2,3,4	\$30
Total :	\$500

DAILY DOUBLE

\$10 ALL / ALL	\$1,000
\$5 1 AND 1	\$5
\$15 1 AND 2	\$15
Total :	\$1,020

PICK 3

\$2 ALL/ALL/ALL	\$2,000
\$5 2-1-6	\$5
\$2 2-1-ALL	\$20
Total :	\$2,025

SUPERFECTA

\$2 ALL/ALL/ALL/ALL	\$10,080
\$10 1-2-1-6	\$10
\$5 Box 1,2,3,4,5,6,7	\$4,200
Total :	\$14,290

PICK 6

\$2 1-2/1-2/1-2/1-2/1-2/1-2	\$128
\$2 1/ALL/6/7/8/ALL	\$200
\$2 1-2-1-6-5-3	\$2
\$2 1-4 / 1-4 / 5-8 / 5-8 / 7-10 / 7-10	\$8,192
Total :	\$8,522