GTECH Colorado

Lottery Operations
SAS No. 70 Report on Controls Placed in Operation
and Tests of Operating Effectiveness
for the period April 1, 2002 through June 30, 2002

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I.   Report of Independent Public Accountants

Report of Independent Public Accountants

To Members of the Legislative Audit Committee and GTECH Colorado Management:

We have examined the accompanying description of the controls at GTECH Colorado as those controls relate to the operations for the Colorado Lottery. Our examination included procedures to obtain reasonable assurance about whether (1) the accompanying description presents fairly, in all material respects, the aspects of GTECH Colorado's controls that may be relevant to a user organization's internal control as it relates to an audit of financial statements; (2) the controls included in the description were suitably designed to achieve the control objectives specified in the description, if those controls were complied with satisfactorily, and user organizations applied the controls contemplated in the design of GTECH Colorado's controls; and (3) such controls had been placed in operation as of June 30, 2002. The control objectives were specified by the management of GTECH Colorado and the Colorado Lottery.

Our examination was performed in accordance with standards established by the American Institute of Certified Public Accountants and included those procedures we considered necessary under the circumstances to obtain a reasonable basis for rendering our opinion.

In our opinion, the accompanying description of the aforementioned controls at GTECH Colorado, as those controls relate to the operations for the Colorado Lottery, presents fairly in all material respects, the relevant aspects of GTECH Colorado's controls that had been placed in operation as of June 30, 2002. Also, in our opinion, the controls as described, are suitably designed to provide reasonable assurance that the specified control objectives would be achieved if the described controls were complied with satisfactorily and user organizations applied the controls contemplated in the design of GTECH Colorado's controls.

In addition to the procedures we considered necessary to render our opinion as expressed in the previous paragraph, we applied tests to specific controls, which are presented in Section VII of this report, to obtain evidence about their effectiveness in meeting the related control objectives described in Section VII, during the period April 1, 2002 to June 30, 2002. The specific controls and the nature, timing, extent, and results of the tests are listed in Section V and VII. This information has been provided to user organizations of GTECH Colorado and to its auditors to be taken into consideration, along with information about the internal control at user organizations, when making assessments of the risk for user organizations. In our opinion, the controls that were tested, as described in Section VII, were operating with sufficient effectiveness to provide reasonable, but not absolute, assurance that the control objectives specified in Section VII were achieved during the period from April 1, 2002 to June 30, 2002.

The relative effectiveness and significance of specific controls at GTECH Colorado and their effect on assessments of control risk at user organizations are dependent on their interaction with the controls and other factors present at individual user organizations. We have performed no procedures to evaluate the effectiveness of controls at individual user organizations.

The description of controls at GTECH Colorado is as of June 30, 2002, and information about tests of the operating effectiveness of specified controls covers the period from April 1, 2002 to June 30, 2002. Any projection of such information to the future is subject to the risk that, because of change, the description may no longer portray the system in existence. The potential effectiveness of specified controls described in Section IV is subject to inherent limitations and, accordingly, errors or irregularities may occur and not be detected. Furthermore, the projection of any conclusions, based on our findings, to future periods is subject

to the risk that (1) changes made to the system or controls, (2) changes in processing requirements, or (3) changes required because of the passage of time may alter the validity of such conclusions.

This report is intended solely for use by members of the Legislative Audit Committee, the management of GTECH Colorado, its user organizations, and the independent auditors of its user organizations. This restriction is not intended to limit distribution of this report, which upon release by the Legislative Audit Committee, is a matter of public record.

Colorado Springs, Colorado

July 25, 2002

II.   Report Summary

Authority, Purpose, and Scope

This audit of the general controls at the Colorado Lottery gaming data center (GTECH Colorado) was conducted under the authority of Section 2-3-103, C.R.S., which authorizes the Office of the State Auditor to conduct audits of all departments, institutions, and agencies of the state government. This audit was conducted in accordance with generally accepted auditing standards established by the American Institute of Certified Public Accountants. Audit work was performed between June and July 2002.

This report on policies and procedures placed in operation and tests of operating effectiveness is intended to provide interested parties with information sufficient to obtain an understanding of those aspects of GTECH Colorado's internal control policies and procedures that may be relevant to a user organization's internal controls, and reduce the assessed level of control risk below the maximum for certain financial statement assertions.

Concerns, if any, noted by Grant Thornton LLP, regarding the adequacy of the controls identified to achieve the stated objective or the level of compliance with the controls are presented in Section IV – *Findings and Recommendations.* Concerns identified herein are not necessarily weaknesses in the total system of internal controls at GTECH Colorado, as those controls relate to the processes surrounding the operations for the Colorado Lottery, as this determination can only be made after consideration of controls in place at the user organization. Control considerations that should be exercised by clients in order to complement the controls of GTECH Colorado, as those controls relate to the processes surrounding the operations for the Colorado Lottery, to attain the stated objective are presented in Section VIII.

Although our audit objectives did not include a review of general and application controls over the Colorado Lottery, during the course of our review of GTECH Colorado we discovered controls issues that related to the Colorado Lottery which have been detailed separately in a report to the Colorado Lottery management.

The control procedures at GTECH Colorado are designed to interact with those at the Colorado Lottery to protect data, systems and programs from loss or unauthorized access.

Summary of Findings and Recommendations

To test GTECH Colorado's compliance with the stated controls, we interviewed various personnel, reviewed documentation and procedures, conducted observations, and performed other tests of compliance with internal procedures. Although GTECH Colorado operates efficiently and controls are in place for day-to-day operations, our findings indicated that GTECH Colorado's controls could be improved in certain areas. The following is a summary of the more significant findings contained in the report.

GTECH Colorado - SAS 70
Report Summary

Logical Access

VAX Environment

The VAX environment is where the key gaming applications reside. Security levels inherent in the VAX environment are key to the integrity of the gaming applications. While reviewing security controls, we noted that the system does not force users to change their passwords periodically (i.e., passwords should be changed every 60 days, enforced by the system). The lack of the periodic password change control increases the risk that passwords become known over time by someone other than the intended user, resulting in a potential loss in the ability to accurately authenticate individual users.

In addition, we noted that a number of high-level administrative privileges were accessible to the control room operators. These privileges were beyond their job requirements, and may allow the control room operators to bypass existing logical security mechanisms. This increases the potential for error, which could impact the ongoing integrity of the system.

GTECH should improve and strengthen security in its VAX environment by restricting high-level administrative logical access privileges on a "need to know basis" and enforce password expiration to every 60 days.

Database Security

The Lottery uses the Gaming Environment Management System (GEMS) for reporting purposes as well as various maintenance activities relating to administration of the retailers. Sybase is the database management system that is utilized along with the GEMS application, and is the repository for the GEMS data. Maintenance activities such as adding or subtracting retailers are first performed in the GEMS application. The information is then passed to other application programs where the actual updates occur.

The architecture of the system is such that the security for adding or removing a user, providing access to various system functions, and the ability to modify data and programs, is at the GEMS application level. Access security capabilities at the Sybase level are not being utilized. There is some exposure that all GEMS users can access the GEMS data directly through Sybase utilities, bypassing the logical security afforded through the GEMS application. According to GTECH Colorado and Colorado Lottery officials compensating controls exist at the Colorado Lottery, however, testing the effectiveness of those compensating controls was not part of our review.

GTECH should review the architecture of GEMS, and consider utilizing tighter database level security, which includes utilizing security features within the Sybase database management system.

Summary of Progress Implementing Prior Audit Recommendations

During the Fiscal Year 2001 financial statement audit of the Colorado Lottery, it was recommended that an audit in accordance with Statement of Auditing Standards (SAS) No. 70, *Report on Processing Transactions by Service Organizations*, be performed for its service organization contractor, GTECH Colorado. This SAS No. 70 audit is in response to that recommendation.

Recommendations Locator

Rec. No.	Page No.	Recommendation Summary	GTECH Response	Implementation Date
1.	17	*GTECH should adopt a policy of forcing password change regularly for all users including the control room operators.*	Agree	Implemented
2.	18	*GTECH should ensure that management review the level of access currently given to control room operators, and adopt a policy of providing only those privileges required by these individuals on a day-to-day basis.*	Agree	September 30, 2002
3.	18	*GTECH should adopt a policy of lengthening the LGI_HID_TIM parameter to at least 30 minutes to make it more difficult for anyone attempting unauthorized access.*	Agree	September 30, 2002
4.	19	*GTECH should ensure that the level of physical and logical access be commensurate with current job requirements, and GTECH should also create a periodic review process to help ensure that discrepancies do not occur.*	Agree	July 2002
5.	20	*GTECH should review the architecture of the GEMS application and consider utilizing tighter database level security.*	Agree	

III. GTECH Colorado – Overview of Operations

Overview of Operations

The Colorado Lottery is created under Section 24-35-202, C.R.S. A Commission of five members, appointed by the Governor of Colorado, is responsible for the promulgation of rules and regulations to govern Colorado Lottery operations and carry on a continuous study and investigation of the Colorado Lottery to determine the need for changes in the statutes, rules or regulations or in the administration or operations of the Colorado Lottery. Through the authority established, the Colorado Lottery has contracted with GTECH to provide Lottery operation services.

Background information throughout this report is provided by GTECH Colorado management or the Colorado Lottery management.

Corporate Background

GTECH is an international company that designs, manufactures, installs, and operates on-line and instant ticket wagering systems for domestic and foreign governments and government-licensed organizations. GTECH is headquartered in West Greenwich, Rhode Island and has operating centers (i.e. data centers) throughout the US including Pueblo, Colorado referred to throughout this document as "GTECH Colorado" or the "Colorado Data Center".

GTECH Colorado has contracted to provide data processing and other services to the Colorado Lottery. According to the contract between GTECH Colorado and the Colorado Lottery, GTECH is responsible for the design, development, installation and operation of an on-line lottery gaming system and to provide associated services.

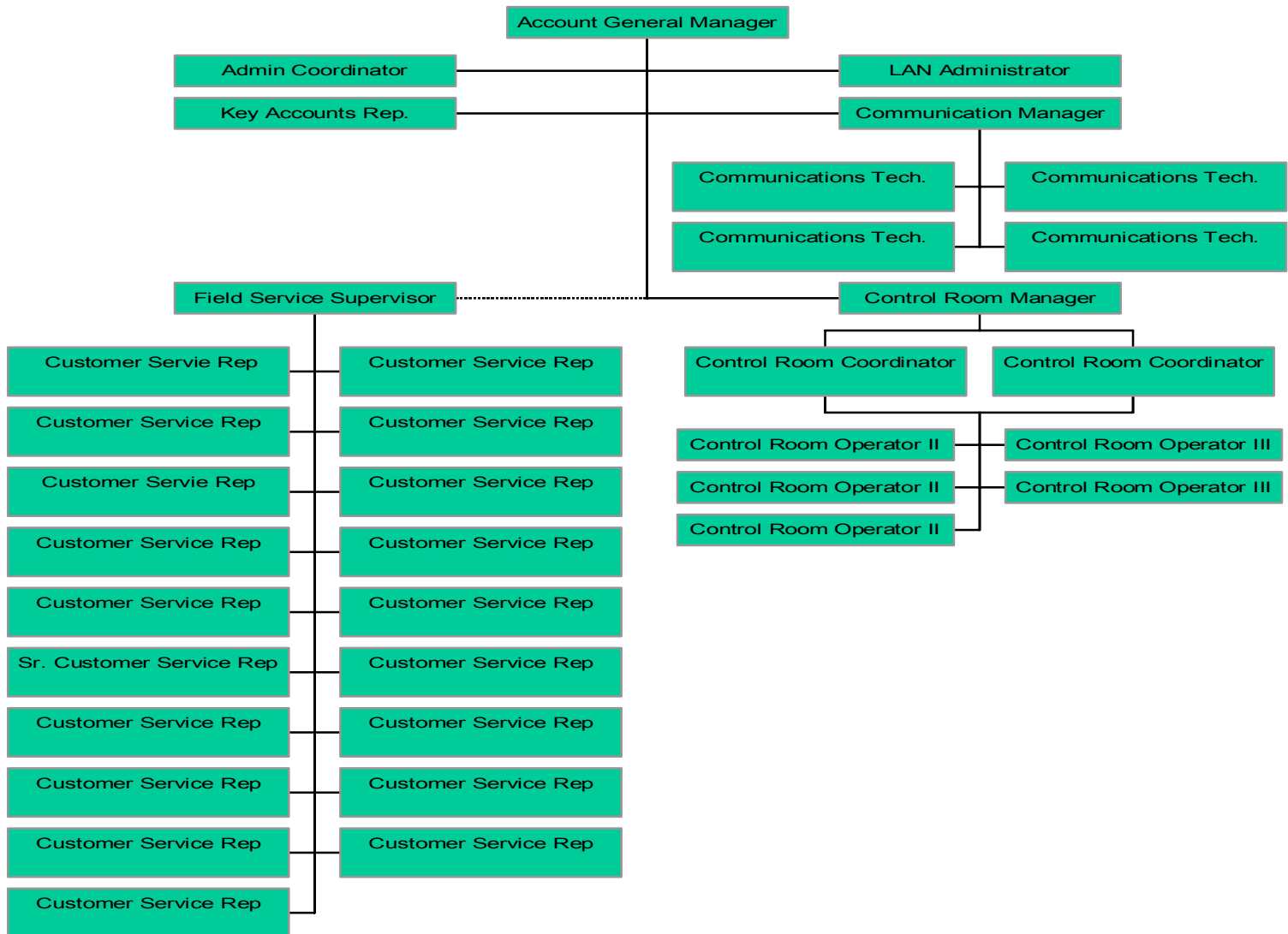GTECH Colorado's activities are under the overall management of the Account General Manager, who is the most senior GTECH employee at the Colorado Data Center.   The organization is divided into the following departments:

- Operations;
- Client Service; and
- Communications

An organizational chart for GTECH is shown on the following page. A more detailed description of the responsibilities of each department is provided below.

Account General Manager

Admin Coordinator

LAN Administrator

Key Accounts Rep.

Communication Manager

Communications Tech.

Communications Tech.

Communications Tech.

Communications Tech.

Field Service Supervisor

Control Room Manager

Customer Servie Rep

Customer Service Rep

Control Room Coordinator

Control Room Coordinator

Customer Service Rep

Customer Service Rep

Customer Servie Rep

Customer Service Rep

Control Room Operator II

Control Room Operator III

Customer Service Rep

Customer Service Rep

Control Room Operator II

Control Room Operator III

Customer Service Rep

Customer Service Rep

Control Room Operator II

Sr. Customer Service Rep

Customer Service Rep

Customer Service Rep

Customer Service Rep

Customer Service Rep

Customer Service Rep

Customer Service Rep

Customer Service Rep

Customer Service Rep

Information Systems Environment

The Information Systems Environment for GTECH Consists of:

1. Lottery Terminals – Lottery terminals are located at retail locations throughout the State of Colorado. There are three types of lottery terminals:

    - a dial-up GTECH Validation Terminal (GVT) for instant ticket games
    - PowerBall Express for on-line quick pick games
    - or a dual purpose on-line/instant ticket game (Spiffany) terminal

    The Spiffany and PowerBall Express terminals communicate with the central systems using analog and digital telephone circuits and satellite technology. At the time of the review, GTECH had approximately 320 GVTs, 714 PowerBall Express and 2,453 Spiffany terminals.

2. Communications between Terminals and the Central Data Center – Communications are routed through communications processors to a Digital Equipment Corporation (DEC VAX Model 7700) computer, of which there are three in the Pueblo facility. These VAX systems are based on DEC's 64-bit VAX processor and have one CPU and 512 MB of memory. The on-line transaction processing applications reside on this equipment. One system runs live, another is a hot backup. A hot backup provides a ready online backup in the event the live environment should go offline. This diminishes the risk of delays in processing. Additionally, a third system is available for testing. The VAX systems are running release 6.2 of the Open VMS (Virtual Memory System) operating system and each system has various disk drives, tape units, local terminals, and printers directly attached.

3. Remote Logging System at Colorado Lottery Headquarters – The remote logging system located at the Colorado Lottery headquarters in Pueblo, Colorado consists of a DEC 4090, which logs dynamically to tape, disk and optical. This is the source of information for the Lottery's Internal Control System. Information stored here is used to match and verify winning draw numbers recorded in the main VAX systems described above.

    In conjunction with the above systems, GTECH has installed two DEC AlphaServer Model 2100a computers, at the Pueblo site, using the Digital UNIX (formerly OSF/1) operating systems to handle the Gaming Environment Management System (GEMS).

4. Gaming Environment Management System (GEMS) – GEMS performs various administrative functions in support of the transaction processing applications. Each of the DEC AlphaServers contains four CPUs and 1024 MB of memory. One GEMS system runs live while the other is available for testing and as a cold backup. A cold backup is an offline backup that can be brought online in a short period of time.

GTECH Departments and Responsibilities

Control Room

Operations
The operations group is responsible for the operation of the information systems. Control room operators, under the supervision of a Control Room Coordinator, are responsible for computer job scheduling, system monitoring, and output control.

The operations group is also responsible for:

- software testing and change management;
- coordination of system access in conjunction with the Colorado Lottery; and
- site security and disaster recovery planning.

Retailer Services
GTECH Customer Service provides retailers with a "Hotline" support group. This group is responsible for local and retailer terminal network activities support and is the initial point of contact for retailers with questions or problems. Hotline operators receive calls from retailers across the state for emergency supply orders, requests for equipment repairs and questions regarding procedures. Emergency supply orders and equipment service calls are routed via dispatchers to an available Customer Service Sales Representative (CSR) for response. The Hotline group works out of the GTECH National Response Center in Boca Raton, Florida.

Communications Services

The Communications Service department ensures that any retailer telecommunications problems are resolved. The Communication Service department also ensures networks linking Lottery retailers, Lottery offices, and Lottery claim centers, and GTECH Colorado facilities across the State of Colorado are operational. The Communications Services department is also responsible for network configurations, equipment and technology.

The Communications Manager is responsible for ensuring the proper operation of all communications equipment within the data facility as well as supervising the retailer network communications service restoration activities.

The LAN Administrator supports the Local Area Networks (LANs). The LAN is used to connect users within the GTECH Colorado sites to the range of available computer systems within the organization.

Field Services

The Field Services department is responsible for coordinating the repair of terminals and peripherals at the regional repair facility and providing distribution services.

The Technical Services Manager is responsible for the storage and distribution of consumable materials and oversees the daily warehouse operations. This group is also responsible for coordinating the receipt of consumables from the suppliers. Consumables, which includes supplies such as ticket stock, ribbons, and playslips for the Lottery, are distributed through common carriers. Each Customer Service Representative carries some consumables for emergency delivery.

Client Services

The Client Service Operations group consists of GTECH Customer Service Representatives (CSRs) located across the State. A GTECH Client Service Supervisor oversees and manages the activities of the CSRs. The CSRs main role is to install terminals and respond to calls related to the terminals at retailer premises. Basic adjustment to terminals are completed in Pueblo and Aurora, Colorado, while major terminal repair is completed from other GTECH locations.

Administration

The administrative functions that support the operations of GTECH Colorado report directly to the Account General Manager. The administrative function includes the human resources related functions such as hiring, termination, continuing education and other related tasks for GTECH Colorado employees.

IV.   GTECH Colorado – Findings and Recommendations

Introduction

Our tests of the effectiveness of GTECH Colorado's controls included in Section VII were designed to determine whether:

- the description of GTECH's controls present fairly, in all material respects, the aspects of GTECH Colorado's controls that may be relevant to a user organization's internal control as those controls relate to an audit of financial statements;

- the controls were suitably designed to achieve the control objectives stated, if those controls were complied with satisfactorily and the Colorado Lottery applied the internal controls contemplated in the design of GTECH Colorado's controls which are set forth as "User Control Considerations" in Section VIII;

- the controls had been placed in operation as of June 30, 2002; and

- the controls were operating with sufficient effectiveness to provide reasonable, but not absolute, assurance that the control objectives stated were achieved during the period covered by our report.

We identified opportunities within GTECH Colorado for improving the controls, as related to the services provided by GTECH to the Colorado Lottery. This section contains recommendations regarding the effectiveness of controls specified by the Colorado Lottery and GTECH Colorado.

Findings and Recommendations

Logical Access

1.0 VAX Operating System

The VAX environment is where the key gaming applications reside. VAX users include most of the GTECH Colorado employees. Because there are a number of users, security at the VAX level is important to ensure ongoing integrity of operations. We reviewed a number of security parameters in place for all VAX users and identified the following issues.

- Password Change (Control Procedure C2.3)

  We reviewed the parameter that forces password change for all the GTECH Colorado employees. We noted that password change is not forced for the control room operators. A number of them have not changed their passwords for two years. This increases the potential for their passwords to be compromised, which in turn increases the risk of unauthorized access to systems and data. Forcing a change every 60 days would be reasonable. This was a previous recommendation in a SAS 70 audit performed during October 1995. GTECH responded that they would implement this control at that time.

Recommendation No. 1 - *GTECH should adopt a policy of forcing password change for all users including the control room operators. This should be done no less frequently than every 60 days.*

GTECH Response:

Implemented. Agree with the concept but disagree with the finding. The recommendation is unnecessary in light of the current practice.

GTECH and the Lottery Security Section adopted a policy of forcing password changes every 90 days and documented this agreement within the Security Plan. This policy has been in effect and enforced for several years on the systems utilized for production. The audit observation resulted from an oversight that occurred when the system that had been utilized for testing for the past 5-6 years was moved into the live environment and used for the audit. This has been addressed on the test system and all systems (both production and test) will be periodically audited to ensure compliance with the policy.

It is important to understand that all VMS systems are located within a secured room within a secured facility. Access to both the room and facility is strictly controlled by the Lottery and limited to operations staff responsible for operating and maintaining the systems. The VMS systems are located within the facility and may be accessed only from within the facility. The VMS systems can not be accessed from outside of the secured facility.

Auditor's Addendum: *The importance of controls over Colorado Lottery transactions cannot be overstated. Our testing was designed, among other things to identify instances in which actual practices were not consistent with GTECH's stated control objectives. This recommendation was made because such an instance was found. The deviation from policy is noted in GTECH's response.*

- Administrative Privileges (Control Procedures C2.2 and C2.4)

We reviewed the assignment of high-level administrative privileges by examining the VAX user profiles for all the GTECH Colorado employees. We noted that the control room operators have a number of high-level privileges that would appear to be unnecessary in performing their every day job functions. For example:

Security – ability to shutdown the machine/perform security related functions.
World – ability to control any process on the system.
Bypass – ability to bypass any object protection on the system.
Setpriv – allows users to change security around objects.

Most users should only require limited (TMPMBX and NETMBX) privileges which are more in line with normal operator responsibilities, and users should only be granted additional privileges on an as needed basis. This was an issue during a SAS 70 audit in October 1995. At this time GTECH concurred with recommendations to improve, and stated they would implement changes.

Recommendation No. 2 -*GTECH should ensure that management reviews the level of access currently given to control room operators, and adopt a policy of providing only those privileges required by these individuals on a day-to-day basis.*

> *GTECH Response:*
>
> Agree. Will be implemented by September 30, 2002.

- Parameter Settings (Control Procedure C2.4)

We noted that a parameter that enforces a delay for a subsequent attempt to re-logon (LGI_HID_TIM) was set at 5 minutes, the period of time the system prevents anyone from logging onto the system, if it detects an unauthorized access attempt. The risk is that with a five minute setting, there is more opportunity for someone to continue attempts at unauthorized access. This issue was raised during the previous SAS 70 undertaken during October of 1995, at which time GTECH concurred and stated it would address the issue. However, our audit found that the recommendation was not implemented.

Recommendation No. 3 –*GTECH should adopt a policy of lengthening the LGI_HID_TIM parameter to at least 30 minutes to make it more difficult for anyone attempting unauthorized access.*

> *GTECH Response:*
>
> Agree in concept. GTECH will implement by September 30, 2002.
>
> The parameter was lengthened as a result of the SAS 70 undertaken in 1995. However, it appears that during a system upgrade to proactively address possible Y2K issues during November, 1999, the parameter reverted back to the default setting. The parameter setting will be reset to 30 minutes and VMS systems will be periodically audited to ensure the parameter remains at the prescribed setting.
>
> The industry standards cited in the report relate to systems that can be accessed by multiple levels and types of users from various locations. It is important to understand that all VMS systems are located within a secured room within a secured facility. Access to both the room and facility is strictly controlled by the Lottery and limited to operations staff responsible for operating and maintaining the systems. The VMS systems are located within the facility and may be accessed only from within the facility. The VMS systems can not be accessed from outside of the secured facility. This mitigates any opportunity for unauthorized access to the systems.
>
> > **Auditor's Addendum:** *As discussed above, the audit tested controls established by GTECH and noted an exception related to unauthorized access. Controls over Colorado Lottery transactions should be in place in accordance with Colorado Lottery's contract with GTECH.*

- Job Change (Control Procedures C2.4 and F1.2)

While reviewing the VAX access privileges for all GTECH Colorado employees, we noted that an employee who has not been a control room operator for approximately one year still has the same level of access as other operators. In addition, this employee has physical access to the control room, although current job responsibilities do not require it.

Recommendation No. 4 –*GTECH should ensure that the level of physical and logical access be commensurate with current job requirements. GTECH should also create a periodic review process to help ensure that discrepancies do not occur.*

GTECH Response:

Implemented. Agree with the concept but disagree with the finding. The recommendation is merely a restatement of the current practice.

The level of physical and logical access is consistent with job requirements and is periodically reviewed. The single exception noted was an employee who was a Control Room Coordinator that transferred to Field Service. The individual was kept in the system as an emergency resource until he was no longer considered a viable alternative. Consequently, his access was removed in July, 2002.

Auditor's Addendum: *See "Auditor's Addendum" to Recommendation No. 1.*

2.0 Sybase Security: Gaming Environment Management System (GEMS) (Control Procedure C2.6)

Sybase is the Database Management Software utilized in the GEMS application. GEMS data are important for reporting purposes for the Lottery, as well as various maintenance activities relating to administration of the retailers. Maintenance activities, such as adding or subtracting retailers, are first performed in the GEMS application. The information is then passed to the VAX applications where the actual updates occur.

We found that Sybase security is only being utilized to a very basic extent. Every GEMS user has open access at the Sybase level. The GEMS application security is the effective line of defense. A GEMS user could utilize a Sybase utility to access and alter the data directly, not going through the GEMS application, and therefore not subject to any of the application level security described above. There may be some mitigating controls in place to reduce this exposure.

- Accessing the data would require configuring the Sybase utility, which requires a high level of knowledge. This reduces the likelihood of the event and in turn reduces the exposure.
- GTECH management stated that the Colorado Lottery has controls to ensure that software posing a risk (such as the Sybase utility discussed above) is not on any client machines. Because we did not audit the Colorado Lottery internal controls we could not confirm the accuracy of this information. However, GTECH could still improve security controls by tightening database level security.

Recommendation No.5 -GTECH *should review the architecture of the GEMS application and utilize tighter database level security to the extent practicable.*

> *GTECH Response:*
>
> Agree with the concept. Contract change required.
>
> GTECH agrees the database level security could be strengthened, however, the architecture and design of the Colorado gaming system precludes the implementation of the recommended changes without substantial risks to ongoing operations and business processes. GTECH gaming systems that are presently offered to customers utilize a different architecture and design that mitigate these issues. A change to the current system would require contractual changes.

In addition to these findings, during our review of GTECH Colorado we identified controls that are performed by the Colorado Lottery that relate to GTECH Colorado's operations for the Colorado Lottery. We identified some control improvements that, based on the segregation of controls to the Colorado Lottery, were more appropriately directed to the Colorado Lottery management. These recommendations can be found in the Colorado Lottery annual audit report for the Fiscal Year 2002.

V. GTECH Colorado- Description of Controls

Relevant Aspects of the Control Environment, Risk Assessment and Monitoring

Description of Control Environment Elements

General data processing procedures and controls provide the environment for developing, maintaining, and processing the Colorado Lottery gaming applications, and encompass the following areas at GTECH Colorado:

- Organization and Personnel;
- Physical Security;
- Quality Assurance Testing;
- Computer Operation;
- Data and Program Security; and
- Business Continuity/Disaster Recovery Planning.

<u>Organization and Personnel</u>

Position descriptions have been developed that document the functional responsibilities of individuals within the organization.

Key individuals and their functional responsibilities at GTECH are the:

- Account General Manager – Responsible for the overall management and direction of statewide operations. The Account General Manager is also the primary Lottery liaison for GTECH Colorado.

- Control Room Manager – Responsible for the overall management of the Control Room, its personnel and computer systems. The Control Room is the primary computer room that houses operation and database servers necessary for the operation of the Colorado Lottery.

- Control Room Coordinator – Oversees the daily activities of the control room operations personnel to ensure overall efficiency, data integrity, and system performance.

- Computer Operators – Control and monitor the computer systems responsible for the lottery games.

- Communications Manager – Responsible for the overall management of the distribution and communications equipment functions to ensure a high-quality, efficient, and responsive operation.

- Communications Technicians – Responsible for the resolution of communication issues in the retail environment working closely with the Customer Service Representatives (CSRs) and retailers and various telecommunication vendors to resolve issues.

- LAN Administrator – Responsible for the operation and monitoring of the networks, servers and databases.

- Field Services Supervisor – Responsible for the overall management of the CSR staff and retailer satisfaction.

Physical Security

GTECH employees gain access to the Pueblo facility using a microcomputer-based card access and passcode system. Employees are issued an access card that allows entry to predefined areas based on defined responsibilities of the employee of the GTECH Colorado facility.

Closed circuit television cameras and remote monitors record personnel traffic in sensitive areas on video tape. Exterior cameras are active at all entrances, and are monitored by Colorado Lottery Security. Intrusion and motion detection systems are interconnected to the access security system and monitored by a remote monitoring service which will notify a local security firm who will then call police if the correct password is not given to them when they call the GTECH Colorado location.

The control room, which contains the key computer and communication equipment, is located in an interior part of the GTECH Colorado offices at the Pueblo facility. Access to this area is also controlled by the card access and passcode system and becomes more restrictive, based on job function, than the general access to the facility.

A fire detection panel is mounted in the control room of the GTECH Colorado facility. The panel is connected to sensors within the control room. When a fire detection sensor is activated, an alarm signal is automatically sent to a remote monitoring service. The fire department is automatically notified and dispatched when the alarm goes off. The sensor also activates a general alarm that is sounded throughout the building.   The alarm can only be deactivated and reset by the fire department.

The control room utilizes a Halon fire suppression system. Smoke detectors are in use throughout the facilities. Fire extinguishers are located within the control rooms and the building. There are fire exits at the GTECH Colorado facility that may only be opened from within.

Air conditioning units are located in the control room of the GTECH Colorado facility and the temperature is monitored to maintain the appropriate temperature for optimized performance of the operation systems.

The GTECH Colorado facility utilizes uninterruptible power supply (UPS) that continuously conditions the electrical current and could provide up to 60 minutes of backup power, in the event of a loss of commercial power. Additionally, a diesel generator is available to supply power in the event of commercial power interruption. The diesel generator is maintained and tested weekly.

Quality Assurance Testing

Software change requests are initiated by the Lottery and GTECH. The changes are made and tested by the GTECH Software group in Phoenix, Arizona.

Programs are tested by the GTECH programmers using test data. After GTECH system testing is complete, the executable code is transferred to a test environment in Pueblo for GTECH and Colorado Lottery quality assurance testing. Authorized changes are installed in the production environment at GTECH Colorado by Computer Operations personnel.

Computer Operations

The control room is operational 24 hours per day, seven days per week. A Control Room Coordinator is responsible for ensuring operational activities are appropriate and are performed in a timely manner. The computer operations department is responsible for computer job scheduling, system monitoring, and output control.

Extensive checklists and procedures have been developed to guide control room staff in the performance of their duties. These checklists and procedures include system start-up and shut-down, problem diagnosis and resolution, and special processing.

Production job scheduling is the responsibility of the Control Room Coordinator. Computer operators initiate processing jobs based on defined checklists. The checklist includes procedures for recording job activity on a hard copy job log. The job log is initialed by the operator at the completion of each task.

Control room daily activity is recorded in the turnover log. The turnover log is designed to provide the employees coming on duty a status of all activities performed during the previous shift. The turnover log is passed to the new shift at the completion of each shift. System incidents are recorded in a system incident report database and the turnover log. Computer hardware failures are recorded in the turnover and hardware log for review by the vendors' customer engineers.

All items sent to the Colorado Lottery office, including magnetic tapes containing data files and hard copy reports, are accompanied by a GTECH prepared manifest, which contains descriptions of the tapes transferred, tape numbers, signatures of individuals picking-up, delivering, and receiving the tapes. The manifest is returned to GTECH after delivery to acknowledge receipt of the materials sent.

Data and system files are backed up daily and the copies stored at the off-site storage site are available in the event of a disaster at the GTECH Colorado facility. Full back-ups are done on Saturday nights. Incremental back-ups are done on all other nights. Tapes are circulated offsite to a secure location every night except for Saturday and Sunday.

Data and Program Security

General

On-line access to data is controlled by user accounts and passwords. Some of the user accounts and passwords are controlled by the operating systems and some, such as retailer accounts and passwords, are controlled by the applications.

Retailers

Lottery retailers sign on to the systems using a GVT or a Spiffany terminal. Each retailer location is assigned an identification number. The retailer is required to enter the retailer identification number to gain access. The retailer identification number is validated along with the terminal location and communications data for the retailer's premises, preventing the retailer from accessing the systems from another terminal.

Other users

The access of other users is controlled by the operating system and the applications. Access to the VAX is controlled by the security features of the VMS operating system (a multiuser, multitasking, virtual memory operating system that runs on VAX). VMS captive accounts, which restrict users to a defined menu of capabilities, are used to control access where feasible. Non-captive VMS privileges and access to the Digital Control Language (DCL), or command level, is restricted to the Security Administrator and Computer Operations staff.

Each user is assigned a user ID, which is based on approval by the GTECH Control Room Manager. Access capabilities are pre-approved by Lottery Security personnel, based upon standard assignments linked to organizational positions. If there is any deviation from this, regarding a new position or position change, re-approval is necessary from Lottery Security personnel. The actual assignment of the user ID is then performed by the GTECH Security Administrator. Passwords are not required to be changed on initial logon. A small number of group accounts are used by more than one person. These accounts are used by operators for game operation and security administration. User accounts and passwords are administered by the system administrator using VMS. Passwords must be a minimum of six characters. In addition to the above controls, a matrix showing access capabilities of GTECH employees is sent to Lottery Security personnel for review every month.

Applications -- On-line Game

Non-retailer user access to on-line game data is controlled by one or more privileged SQL (Structured Query Language) Server users called system administrators. To create new user groups and to grant or revoke database access, or force a password change, the system administrator must be set up as a special type of user. Passwords are encrypted and are not visible in decrypted format.

When the system administrator adds a user, accounts on the SQL (structured query language) Server and the on-line game host are created. Each user is a member of a user group that exists on both systems. All access is controlled based on the user group.

The system administrator uses the system administration application to control access to Graphical User Interface screens or sets of screens. Many screens are directly connected to pull-down menu choices.

The system administrator can control user access on the front-end application, screen group, or screen level. At any level the administrator can grant view-only or update privilege for a screen or screens. The administrator can also revoke access at any level.

Users of the on-line system will begin a session by logging into the application launcher, which is a graphical menu used to launch the various programs developed by GTECH. The Sybase SQL server validates the user name and password before the user is allowed access to any application. Once validated, the user can see a list of allowed applications for his/her security group. Within each application, the user's level of authorization for specific screens and features is checked. If no access is allowed, the user is presented with a message to that effect. If the user has view-only access, any push buttons that update the database will be disabled.

The system administration application can control access to groups of Remote Procedure Calls (RPC). As the administrator grants access to specific RPCs, the application will add to all RPCs in that RPC group. Each time a session is initiated, the GEMS host provides the permissions for that user's group to the client. The system administrator can also block or allow execution of certain on-line game host programs, such as the programs that control lottery draw dates.

System Software

Changes to the operating systems are limited to those provided by the vendors. Proposed changes are considered by the Corporate Software department of GTECH before being passed to operations at GTECH Colorado. Software changes are loaded onto the appropriate system for testing and then moved to production machines. See the "Quality Assurance Testing" section for additional discussion.

The GTECH Software Group can access the systems through dial-up lines for problem resolution purposes. Inward dialing is permitted only after the Colorado Lottery approves the request and the control room staff have activated the modems. Any other time, the modems remain turned off. Additional security requires randomly assigned phone numbers to be utilized. The GTECH software group is informed by GTECH Colorado which phone number to use for a specific access request.

Business Continuity/Disaster Recovery Planning

GTECH Colorado has developed and documented a disaster recovery plan addressing a range of possible disasters impacting the provision of service. The plan identifies steps to be taken and the responsibilities of designated individuals in the event of a disaster. The plan addresses the recovery of the different business functions and physical locations of GTECH Colorado. Copies of the plan are stored at secured off-site locations. The disaster recovery plan meets the requirements stated in the contract between GTECH Colorado and the Colorado Lottery.

A significant level of redundancy is incorporated in the hardware configurations to minimize the impact of any local problems and to facilitate recovery. In the event of a more serious disaster (i.e., loss of data center due to fire, flood, etc.), data processing services would be set up in a portable unit.

GTECH operates a duplex (two way communication) DEC system to support the communications with the retailer terminals and transaction processing. At any time, two of the three DEC systems installed in Colorado are linked together to simultaneously process all of the transaction information. One of the systems controls the network and has primary responsibility for transaction processing. The secondary system is the hot backup, the spare system is a cold backup.

The primary computer remains in control until a problem occurs. The secondary system acts as a hot backup for the primary system and reduces the risk of a complete termination of gaming activity. The hot backup

allows for an automatic takeover by the secondary in the event of a problem with the primary CPU, its software and data, or any of its critical peripherals.

If one system fails in a duplex configuration, the other system is expected to continue all processing operations with a minimum interruption in service. Processing at the retailer level should continue without interruption.

VI. GTECH Colorado - Description of Gaming Systems

Overview Description of Gaming Systems

The gaming systems can be divided into three elements:

- On-line game transaction processing;
- Instant ticket game transaction pass through; and
- Accounting, reporting and administration.

The applications are built under GTECH Colorado's own operations' architecture using various graphical user interfaces and are described below.

Retailers

Retailers apply to the Lottery for a license to sell lottery tickets. Retailer information is entered into the Colorado Lottery's Wang system by Lottery personnel, and if the retailer passes a number of approval checks performed by the Colorado Lottery, they are activated as an authorized Colorado Lottery retailer. The Wang system is maintained by Colorado Lottery personnel, and is housed at the Colorado Lottery premises, away from the GTECH facility.

After a retailer is approved, the Colorado Lottery submits an electronic file update to GTECH Colorado's database. The file provides GTECH Colorado's customer service staff with the appropriate approval and information to install and connect a GVT or a Spiffany terminal at the retailer's premises. When a terminal is installed it is assigned a password so that when it communicates with the GTECH Colorado operating system the communication is verified. A GVT is installed for a retailer who sells only instant tickets. The GVT is used for instant ticket validation, tracking of inventory (through the delivery confirmation, activation and settlement functions) and retailer reporting (of sales, account balance and inventory data). A retailer who sells both instant and on-line tickets has a Spiffany on-line terminal. In addition to instant ticket game functions, the on-line terminals are used to generate on-line game tickets, validate on-line winning tickets, cancel tickets, and produce reports for the retailer. Once a GVT or Spiffany terminal is installed the retailer may begin to receive ticket shipments, make sales, and validate prize-winning tickets.

When a retailer signs on to the GTECH operating system, the operating system verifies that it is an authorized retailer and that a four-digit password is entered. The retailer communications data and password are verified against the retailer file sent to the VAX from the Gaming Environment Management System (GEMS) .

Retailers who cease to be Lottery retailers are changed to a deactivated status on the system by Lottery personnel. This information is first entered into the Lottery's Wang system and then passed by electronic file to the GTECH Colorado's database. Deactivation prevents the retailer from generating on-line tickets or receiving additional instant ticket shipments. GTECH Colorado is responsible for removing communications data, except in the case of a sale of the business where the new owner has already been approved as a retailer.

On-line Game System and Processing

<u>Games</u>

Lotto

- 6 of 42; (6 numbers to be selected by the ticket purchaser. The possible number range goes up to 42)
- Lotto players must play a minimum of one panel per play for $1;
- Up to 10 panels by playslip or by keyboard entry;
- Up to 10 future draws; and
- Draws occur on Wednesday and Saturday evenings with draw break (discussed later in this document) beginning at 7:30 p.m. and the draw being held shortly thereafter, according to Lottery Drawing Security Procedures.

CASH 5

- 5 of 32; (5 numbers to be selected by the ticket purchaser. The possible number range goes up to 32)
- Cash 5 players must play a minimum of one panel per play for $1;
- Up to 10 panels by playslip or by keyboard entry;
- 10 future draws; and
- Draws are held Monday, Tuesday, Wednesday, Thursday, Friday and Saturday with draw break beginning at 7:30 p.m. and the draw being held shortly thereafter, according to Lottery Drawing Security Procedures.

PowerBall

- 5 of 49 and 1 of 42; (5 numbers to be selected by the ticket purchaser. The possible number range goes up to 49. Additionally, PowerBall provides for a "Power Play" which requires a match of one number out of 42 possible numbers)
- PowerBall players must play a minimum of one panel for $1 per panel with the option of Power Play for an additional $1;
- Up to 5 panels by manual entry or 1 - 10 panels using playslip or quick pick (QP);
- Up to 10 future draws; and
- Draws on Wednesday and Saturday evenings with draw break beginning at 7:30 p.m. and the draw being held at 8:59 p.m.

Retailers can validate tickets for prizes up to $599 during a 180–day cashing period. For prizes over $599, the winners have to visit a Lottery Redemption Center to claim their prizes. A quick pick option is available on each game. Lotto and CASH 5 tickets can be canceled by the retailer, at the issuing terminal prior to the draw, end of day, or within one hour of the transaction (whichever is first) but PowerBall tickets cannot be canceled once printed.

<u>Software</u>

The on-line game system has three software components:

- Terminal;
- Communications; and
- On-line transaction processing (OLTP).

The terminal application software is responsible for accepting retailer terminal input, generating a transaction message, transmitting and receiving the message, and printing the ticket.

Communications is the component which transmits the transaction message from the terminal to the transaction processing system and back again. Terminal and central system software are both equipped with a communications layer which allows these two components to transmit and receive the transaction message.

The transaction processing system software manages individual transaction processing as well as the passing of transactions from system to system.

<u>Terminal Application</u> – The retailer terminal contains application software which is used to capture the input and build a transaction message using the information entered by the retailer. Each terminal also contains a small amount of communications functionality to pass the transaction to the central system. Terminals receive application software through a process known as downloading. Downloads can be either "forced" by central when the software has been changed or "requested" by the terminal if it is in any doubt about the integrity of its software.

<u>Communications System</u> – The Communications System (COMM) includes all protocol functions necessary for communication between the OLTP system and the retailer terminal network. The Communications System implements the GTECH Network Architecture (GNA). GNA is based on the Open System Interconnect (OSI) model and protocols, with GTECH-developed extensions that optimize performance in an OLTP environment. The use of OSI technology permits the flexibility to utilize a wide variety of network infrastructures, without major changes to the communications software or OLTP system.

<u>On-line Transaction Processing</u> – The OLTP system contains independent products with each product consisting of a Product Processor and a Message Formatter. Each Product Processor interfaces with the GTECH Transaction Management Subsystem (GTMS) and each Message Formatter interfaces with the common Gateway. The COMM Product has an additional interface with the Terminal Communications Network (COMM system).

Transaction messages originating at the point-of-sales terminals located in the retailer establishments are routed through the terminal communications network to the Communication product where they are passed, via GTMS, to the appropriate product for processing.

Each product within OLTP is also capable of processing commands and inquiries originating in GEMS or the On-line Product Management (OLPM) subsystem. They are routed to the Gateway via a LAN where they are passed to the appropriate Message Formatter, then to the Product Processor.

The primary elements of the OLTP and the functions it provides are summarized below.

Start-Up
A start-up batch program is used by the operations staff to begin system operation. It prepares the system for on-line operation by installing the on-line transaction processing software. The operator is prompted for the products to start as well as the systems to start.

Once the start-up executes successfully, all other gaming executables for that product will be started.

Transaction Processing
After transaction processing has been enabled, retailers can submit wager data, validation data, or information requests via the terminal. The following describes the same general process that each type of transaction uses:

1. The transaction message is built from the data entered by the retailer, assigned a Terminal Sequence Number, encrypted at the terminal, and passed to the communications subsystem.
2. The transaction is transfered from the terminal to the primary transaction processor via the communications subsystem.
3. The primary processor decrypts the transaction, adds information to the transaction including which terminal sent the message, and that terminal's status and privileges. The transaction is then sent to the appropriate section within the product processing component.
4. The product verifies that the terminal has the appropriate privileges and is signed on. When the privileges are verified, the product then checks the validity of the transaction.
5. If the transaction is valid, the product then builds a log message and updates its internal information to reflect the changes required by the transaction. These changes would include accounting and other information.
6. The product builds the response to the transaction.
7. The transaction is logged to the Product Transaction Master File (PTM).
8. The primary system transaction processor assigns a sequence number, time stamps the transaction, and logs it to its MJF (master journal file) and BJF (backup journal file).
9. The primary transaction processor sends the transaction to its counterpart running on the secondary system and to the remote logger.
10. The secondary transaction processor logs the transaction to its MJF and BJF and then sends the individual transactions to the products for reprocessing. The secondary system can actively request any missing part of the MJF from the primary in the event of a data transmission error between the primary and the secondary.
11. After the transaction has been acknowledged by the secondary, it is encrypted and sent back to the terminal via the communications subsystem.
12. The terminal then issues the ticket (or other record, for different transaction types) to the retailer.

The following data appears on a ticket:

- game name;
- the selected numbers;
- the draw date;
- the amount;
- the GGUARD number (used for tracking purposes);
- the retailer number, and
- the ticket number which is comprised of the control date, the control number, which is a scrambled representation of the serial number assigned to the transaction by the central system, the product identifier and check digits.

Winner Selection
Winner selection is a process which uses several programs to input the winning numbers, find winning tickets for that drawing, and then merge those tickets into the file holding winners from previous draws.

The first step in performing winner selection is to stop selling tickets for the draw. This is called "closing the pools." The period of time in which sales are suspended is called the drawbreak. Drawbreaks begin at 7:30 p.m. each day except Sunday (no draws). The draw tape is removed under the supervision of the Lottery Drawing Security Investigator, who takes possession of the tape and secures it. As the draw tape is dismounted, the remote optical logging disk is dismounted at the Lottery facility and secured. Transaction data is electronically logged to a remote system at the Lottery during the day and is analyzed by the Lottery's Internal Control System to verify the results of the on-line winner selection programs.

Winning numbers are entered by the Lottery and confirmed by GTECH. In addition, the Lottery enters the winning amounts to be paid and these are also confirmed by GTECH. GTECH operations transfers reports and monitors the console throughout the draw process.

After the winning numbers have been entered, the On-line Tickets and Winners File (OTWF) and the Product Transaction Master are scanned to find the winners for that draw. The winning and multi-draw tickets are loaded into a new OTWF. This is done after close of business to ensure validations cannot be done until the next day. The last step in the winner selection process is to update the new winning tickets in the OTWF with their prize values.

Dayend
Dayend is the routine used to conclude a day's processing and take the system into the next business cycle. This process automatically begins at the prescribed time and is initiated by the GTECH Transaction Management System (GTMS).

After Dayend procedures are performed, the transaction files and other vital game files from the previous day are backed up by operations and includes the following sequence of events:

- GTMS changes the status of all products to prevent any new input from the terminal and all pending transactions are processed;
- GTMS sends a request to each product to initiate its dayend;
- all terminal input is disabled at 11:59 p.m.;
- current MJF is closed and system begins logging to a new MJF for the next day;
- each product acknowledges the GTMS dayend request;

- each product completes processing all transactions in progress;
- each product sends a message to GTMS indicating that it has completed processing transactions, which GTMS acknowledges (this message lets GTMS close the current log file after it receives the last product's message);
- each product closes its product log;
- each product writes its final end-of-day checkpoint;
- each product copies the retailer data in memory into the product's file for that day;
- each product begins updating the teller sales file from the agent file;
- each product begins updating the terminal sales file from the agent file;
- each product begins updating the terminal sales file from the terminal file;
- each product clears the previous day's sales and other product-related information from memory in preparation for the next day;
- each product sends a message to its input/output server process to switch files to the next day;
- each product sends a message to GTMS to indicate that it is ready for the next day (GTMS will acknowledge receiving this message);
- operations can then initiate batch processing activities through the OLPM interface. The daily tasks to be performed are based on the events configured in the product's Product Definition File (PDF) and the GTMS System Configuration File (GTMS-SCF) and include report production, winner selection, tape production and purge routines; and
- Reports are generated by batch processes on the central system and GEMS (users can also create reports from GEMS using third-party tools such as IMPROMPTU and POWER PLAY).

Utilities
Software utilities are a broad group of programs that allow the operator the ability to change many of the system parameters. The operator can change network configuration, communication parameters, game parameters, and retailer access to the network. These changes are written to the respective files and will take effect the next time the system goes on-line.

Accounting, Reporting and Administration

Accounting, reporting and administration functions are provided by the Gaming Environment Management Subsystem (GEMS). GEMS contains the following subsystems:

- Retailer Management;
- Device Management;
- Historical Financial Data;
- Retailer Accounting and Invoicing;
- Transaction Data Analysis;
- Field Service Management;
- Repair Depot Management; and
- Ad-Hoc Reporting.

The software architecture for GEMS is based on the Sybase SQL Server Relational Database Management System (RDBMS). All GEMS applications use a SQL Server database for data storage.

The GEMS applications were designed using a client-server architecture. The client applications run on IBM-compatible PCs under Microsoft Windows.

The accounting week ends on Thursday night. GEMS calculates the balance owed by all retailers from on-line files received daily. GTECH produces invoicing but it is only used for Lottery balancing and terminal sales reports. Invoice data is calculated by Lottery and provided to terminals via a pass-through request.

Retailers receive a summary invoice from the prior week's activities at the GVT or On-line terminal. Retailers also receive a more detailed statement from the Lottery containing on-line charges, instant charges, and all other charges and adjustments.

VII. Description and Testing of Key Controls

Control Objectives, Control Activities and Tests Performed

A system of internal control is intended to provide reasonable, but not absolute, assurance that the control objectives are achieved. The concept of reasonable assurance recognizes that the cost of a system of internal control should not exceed the benefits expected to be derived and also recognizes that the evaluation of the cost-benefit relationship requires estimates and judgment by management.

The control objectives, which were specified by the Colorado Lottery and GTECH Colorado, and the accompanying description of controls cover the following areas of GTECH Colorado as it relates to the Colorado Lottery operations:

- On-line Game Processing;
- Organization and Administration;
- Computer Operations;
- Logical Access Controls;
- Computer Operations;
- Systems Development and Maintenance;
- Backup and Disaster Recovery and;
- Data Network Operations;

Each control objective stated is followed by the corresponding controls that have been established by the Colorado Lottery. Following the description of the controls is a summary of tests performed by Grant Thornton LLP to determine that the control activities in place were operating with sufficient effectiveness to provide reasonable, but not absolute, assurance that the control objectives specified were achieved during the period from April 1, 2002 through June 30, 2002.

Tests performed of the operational effectiveness of the controls detailed in the following matrices are described below:

TYPE	DESCRIPTION
Inquiry	Inquired of appropriate personnel. Inquiries seeking relevant information or representation from GTECH Colorado personnel were performed to obtain, among other things: • Knowledge and additional information regarding the policy or procedure. • Corroborating evidence of the policy or procedure. As inquiries were performed for substantially all controls, the test was not listed individually for every control shown in the accompanying matrices.
Inspection	Inspected documents and records indicating performance of the controls. This includes, among other things: • Inspection of reconciliations and management reports that age or quantify reconciling items to assess whether balances and reconciling items are properly monitored, controlled and resolved on a timely basis. • Examination of source documentation and authorizations to verify propriety of transactions processed.

- Examination of documents or records for evidence of performance, such as the existence of initials or signatures.
- Inspection of GTECH Colorado's systems documentation, such as operations manuals, flow charts and job descriptions.

Observation   Observed the application or existence of specific controls as represented.

Reperformance   Reperformed the control or processing application of the controls to ensure the accuracy of its operation. This includes, among other things:
- Obtaining evidence of the arithmetical accuracy and correct processing of transactions by performing independent calculations.
- Reperforming the matching of various system records by independently matching the same records and comparing reconciling items to the Company's prepared reconciliations.

Control Objectives	Control Procedures	Testing Performed	Test Results
A. On-line Gaming Process			
Access to Game Processing Functions			
A1. Access to on-line wagering functions and data is restricted to appropriately authorized personnel.	A1.1. All GTECH terminals have built-in logical security requiring a password prior to execution of on-line game processes.	*A.1.1 Reperformance* Attempted to access on-line gaming functions without a valid password.	A1.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	A1.2. All GTECH terminal sign-on activity is automatically logged to the Master Journal File (MJF) by the GTECH on-line system for review by Lottery personnel.	*A1.2 Inspection* Reviewed Transaction Master Inquiry Reports (TMIR) for successful and unsuccessful terminal sign on activity.	A1.2 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	A1.3. All proprietary and financial data (including wager and validation) transmitted between the retail terminals and the GTECH on-line system is encrypted.	*A1.3 Observation* Reviewed the use of encryption and verified that it was active on the GTECH on-line system.	A1.3 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	A1.4. Modifications to GTECH on-line system data (including wager and validation) is restricted by system software features.	*A1.4 Observation* Observed that editors were not present on the production system.	A1.4 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
A2. Access to all retailer master and validation data	A2.1. The GTECH systems include built-in application level security that restricts access to the	*A2.1 Observation* Reviewed the appropriateness of	A2.1 Based on the tests of operating effectiveness

Control Objectives	Control Procedures	Testing Performed	Test Results
is restricted to appropriately authorized personnel.	retailer master and validation files to authorized Lottery and GTECH personnel.	application level security for all users (Control processes managed by the Colorado Lottery).	described, the controls are operating with sufficient effectiveness to achieve this control objective.
A3. Access to sensitive gaming commands is restricted to appropriately authorized personnel.	A3.1. The GTECH on-line system includes built-in application level security that restricts access to gaming commands to authorized Lottery personnel and selected GTECH personnel.	*A3.1 Observation* Reviewed the appropriateness of application level security for all users (Control processes managed by the Colorado Lottery).	A3.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
On-line Game Processing			
A4. All valid tickets are captured as wagers and properly recorded and all invalid tickets are rejected.	A4.1. All GTECH on-line terminals have built-in edit checks to prevent the input of erroneous or incomplete wager data.	*A4.1 Reperformance* Attempted to input erroneous and incomplete wager data.	A4.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	A4.2. All transactions are directed by a program that recognizes the type of transaction and specifies the next processing step (e.g., wager, validation, cancellation, etc.).	*A4.2 Reperformance* Entered test transactions for all transaction types and reviewed TMIR's to ensure that all transaction types were appropriately captured.\n\nTraced all test transaction types to Retailer Sales Reports.	A4.2 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	A4.3. An automated GTECH on-line system function prevents the input of wagers after draw break.	*A4.3 Reperformance* Attempted to input wagers subsequent to draw break.	A4.3 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve

Control Objectives	Control Procedures	Testing Performed	Test Results
			this control objective.
	A4.4. The GTECH on-line system has a set of built-in edit checks for all wagers presented for processing to prevent the processing of erroneous or incomplete wager data.	*A4.4 Inquiry* Inquired of GTECH management.	A4.4 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
A5. Instant Ticket transactions passed through to the Lottery's system for validation are properly logged and reported on the GTECH on-line system.	A5.1. A time and date stamp is applied to each instant ticket transaction and is logged to the MJF.	*A5.1 Reperformance* For a series of test transactions, reviewed TMIR's to ensure proper inclusion of a time and date stamp.	A5.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	A5.2. The validation or error message received from the Instant Ticket system is properly translated, logged and returned to the terminal.	*A5.2 Reperformance* Reviewed attempts to validate winning and non-winning tickets and traced to TMIR's. *Observation* Reviewed messages sent to terminals for appropriateness.	A5.2 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	A5.3. Transactions not receiving the proper authorization or error message from the Instant Ticket system within the designated time frame are closed by the GTECH on-line system and returned to the retailer.	*A5.3 Reperformance* Observed an attempt to validate an Instant Ticket from a terminal not linked to the Lottery's system.	A5.3 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.

Control Objectives	Control Procedures	Testing Performed	Test Results
A6. Wagers are properly summarized and their integrity maintained through end-of-day and drawing processing.	A6.1. All transactions are recorded on three media in two processing environments so that redundant files are maintained for all transaction activity.	*A6.1 Reperformance* Traced a series of test transactions to TMIR's produced from the primary disk, the backup disk and tape.	A6.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	A6.2. Balancing controls are in place to ensure that both systems are synchronized.	*A6.2 Inspection* Reviewed console logs to ensure that system check pointing is performed automatically.	A6.2 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	A6.3. Balancing controls for drawing pools are in place that helps to ensure that overall game closing and winner share processing are accurately completed.	*A6.3 Inspection and Reperformance* For the test transactions entered, reviewed end-of-day reports for proper accumulation and mathematical accuracy.	A6.3 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
A7. Procedures are in place to provide for only authorized internal or retailer requested cancellations of wagers.	A7.1. A request to cancel a ticket is only accepted by the originating terminal.	*A7.1 Reperformance* Attempted to cancel a wager from a terminal different from where the wager was placed.	A7.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	A7.2. All attempts to cancel a ticket are logged to the MJF.	*A7.2 Reperformance* For a series of test transactions traced successful and unsuccessful cancellation attempts to TMIR's.	A7.2 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve

Control Objectives	Control Procedures	Testing Performed	Test Results
			this control objective.
	A7.3. The GTECH on-line system prevents cancellation of a wager subsequent to the game draw.	*A7.3 Reperformance* Attempted to cancel a wager subsequent to the game draw.	A7.3 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	A7.4. The GTECH on-line system prevents cancellation of a wager more than one hour after the wager was placed.	*A7.4 Reperformance* Attempted to cancel a wager more than one hour after the wager was placed.	A7.4 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	A7.5. A report is available to identify a retail location with a cancellation percentage as compared to sales in excess of 25%.	*A7.5 Observation* Observed that the Retailer Daily Sales Report is produced daily.	A7.5 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	A7.6. A wager can only be cancelled on the day of purchase of the ticket.	*A7.6 Reperformance* Attempted to cancel a wager the day after the purchase of the ticket.	A7.6 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	A7.7. A rejected transaction status is initiated by the system when an incomplete processing condition is detected, the transaction is logged, and the appropriate	*A7.7 Inquiry* Inquired of GTECH management.	A7.7 Based on the tests of operating effectiveness described, the controls are

Control Objectives	Control Procedures	Testing Performed	Test Results
	response message is sent to the terminal.		operating with sufficient effectiveness to achieve this control objective.
A8. Winning numbers are input completely and accurately into the GTECH on-line system.	A8.1. All winning Lotto and Cash 5 numbers are input independently by Lottery and GTECH personnel into the GTECH on-line system.	*A8.1 Observation* Observed a live drawing and subsequent winning number dual input process.	A8.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	A.8.2. An automated GTECH on-line system feature agrees the winning numbers as input by both Lottery and GTECH personnel and prevents processing if they are not in agreement.	*A8.2 Reperformance* For test transactions attempted to input winning numbers that did not agree.	A8.2 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
A9. The identification of winning tickets is completely and accurately performed.	A9.1. An automated process within the GTECH on-line system identifies, accumulates and isolates all winning ticket records.	*A9.1 Inspection* Traced winning test transactions to Liability Reports.	A9.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.

Control Objectives	Control Procedures	Testing Performed	Test Results
Validation of Winning Tickets			
A10. Winning tickets are appropriately validated and prize payments made only once for the proper amount.	A10.1. The validation files are used to verify each ticket as a valid wager.	*A10.1 Inspection* For a series of test transactions, determined that winning ticket information written to the validation file was properly extracted from the MJF.	A10.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	A10.2. The Ticket control number is verified.	*A10.2 Reperformance* Attempted to validate both winning and losing tickets by ticket control number.	A10.2 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	A10.3 The validation file is updated for each winning ticket following its presentation by a consumer and validation by the system.	*A10.3 Inspection* Reviewed the status of tickets on the Liability Reports.	A10.3 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
A11. Only valid terminals are recognized by the GTECH on-line system.	A11.1. Only authorized retailer terminals are recognized by the GTECH on-line system and polled for transaction activity.	*A11.1 Reperformance* Attempted to sign-on to an unauthorized retailer terminal.	A11.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	A11.2. Retailer terminals are established only through authorization procedures that include approval by Lottery personnel and initialization by appropriate GTECH personnel.	*A11.2 Inquiry* Inquired of GTECH management.	A11.2 Based on the tests of operating effectiveness described, the controls are operating with sufficient

Control Objectives	Control Procedures	Testing Performed	Test Results
			effectiveness to achieve this control objective.
	A11.3. Retailer terminals can only be established or modified by appropriately approved Lottery and GTECH personnel.	*A11.3 Observation* Reviewed access of users with the ability to modify terminals for appropriateness.	A11.3 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	A11.4. Monitoring of network activity is performed to identify unusual activity that should be further investigated.	*A11.4 Inquiry* Inquired of GTECH management.	A11.4 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
A12. Validation policies pertaining to high-tier and low-tier winning tickets are followed. High-tier winning tickets can only be validated by authorized Lottery Personnel at predetermined terminals.	A12.1. An automated GTECH on-line system feature prevents validation of winning tickets in excess of the dollar limits established for specific classes of terminals.	*A12.1 Reperformance* Attempted to validate a winning ticket in excess of the dollar limit set for specific terminals.	A12.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
Retailer Settlement			
A13. GTECH on-line system data files and related reports properly accumulate ticket sales and redemptions for	A13.1. A system feature within the GTECH on-line system automatically accumulates and summarizes all on-line ticket sales and validations for settlement purposes with retail establishments.	*A13.1 Reperformance and Inspection* Agreed test transactions (sales, validations, cancellations) to Agent Sales Activity Reports.	A13.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve

Control Objectives	Control Procedures	Testing Performed	Test Results
billing purposes, based on retailer and other key reference information.			this control objective.
B. Organization and Administration			
B1. The GTECH system is maintained and operated independently of its users and functional responsibilities are segregated and monitored regularly on a scheduled basis, to control perpetration and concealment of material errors or irregularities. Policies and procedures are in place to restrict key employees from participating in games.	B1.1. The GTECH organization structure provides reasonable segregation of computer operations, system development, technical support and retailer support.	*B1.1 Observation* Reviewed GTECH organization charts and policies and procedures.	B1.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	B1.2. Functional responsibilities are clearly documented in position descriptions.	*B1.2 Observation* Reviewed formal job descriptions.	B1.2 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	B1.3. New employees must sign agreements restricting them from playing any Lottery games.	*B1.3 Inspection* Reviewed hiring conflict of interest and restrictive agreements that new employees are asked to sign for evidence of agreements to not play	B1.3 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve

Control Objectives	Control Procedures	Testing Performed	Test Results
		Lottery games.	this control objective.
	B1.4. Computer operators and supervisors are rotated between shifts.	*B1.4 Inquiry* Inquired of GTECH Management.	B1.4 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	B1.5. Whenever there is a change, or on demand GTECH produces a report which specifies logical access and circulates the list to the Lottery.	*B1.5 Inquiry* Inquired of GTECH and Lottery Management.	B1.5 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
B2. Hiring standards and termination practices are consistent with Lottery requirements.	B2.1. Standards and Practices are in compliance with Lottery requirements.	*B2.1 Inspection* Compared GTECH procedures to Lottery Requirements.	B2.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	B2.2. Standards and Practices are clearly documented in Human Resources (HR) manuals.	*B2.2 Inspection* Examined GTECH HR manuals.	B2.2 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
B3. Confidential information is not disclosed and established	B3.1. The GTECH policies and procedures surrounding ethical conduct and conflict of interest are communicated to all personnel.	*B3.1 Inspection and Reperformance* For a sample of employees, we planned to review personnel files to ensure that	B3.1 **Exception.** We were not able to review personnel files because

Control Objectives	Control Procedures	Testing Performed	Test Results
security policies guide the overall direction and implementation of security.		GTECH Conflict of Interest and Ethical Conduct Agreements as well as Confidentially Agreements had been completed.	GTECH would not give us access.
	B3.2. The policies and procedures are periodically reviewed by GTECH management to ensure that they are still adequate due to changes in technology or GTECH's business.	*B3.2 Inquiry* Inquired of GTECH management.	B3.2 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
C. Logical Access Controls			
C1. Procedures for the assignment or modification of access capabilities have been established.	C1.1. GTECH management monitors employees with access to system and data files and the levels of access granted to those employees.	*C1.1 Inspection* Reviewed procedures for granting access to system resources.	C1.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
C2. Access to system resources is restricted to appropriately authorized users.	C2.1. Access to system and data files is controlled by the use of built-in VMS security features.	*C2.1 Inspection and Observation* Reviewed VMS security related system parameters.	C2.1 **Exception**. See exceptions related to Logical Security – VAX Operating System, (Parameter Settings), in Section IV.
	C2.2. Access to operating system command lines and powerful system utilities is restricted to control room operators.	*C2.2 Inspection and Observation* Reviewed VMS security related system parameters.	C2.2 **Exception.** See exceptions related to Logical Security – VAX Operating System, (Administrative Privileges), in Section IV.

Control Objectives	Control Procedures	Testing Performed	Test Results
	C2.3. User ID's and passwords are required to access the VMS processing environment.	*C2.3 Inspection and Observation* Reviewed VMS security related system parameters.	C2.3 **Exception.** See exceptions related to Logical Security, VAX Operating System, (Password Change), in Section IV.
	C2.4. Access to system administrative functions is restricted to appropriately authorized users.	*C2.4 Inspection and Observation* Reviewed VMS security related system parameters.	C2.4 **Exception.** See exceptions related Logical Security, VAX Operating System, (Parameter Settings, Job Change and Administrative Privileges), in Section IV.
	C2.5. The VMS operating system provides an audit trail of selected security related events.	*C2.5 Inspection and Observation* Reviewed VMS audit logging parameters.	C2.5 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	C2.6. Access to GEMS system is controlled appropriately through key operating system and DBMS level security.	C2.6 Reviewed list of Sybase users, level of user access, connectivity to the database.	C2.6 **Exception.** See exceptions related to Logical Security, Sybase Security (GEMS), in Section IV.
D. Computer Operations			
D1. The scheduling and set-up of daily and drawing computer processing is performed,	D1.1. The computer operators utilize control room checklists to ensure that jobs are run in the correct order to ensure that all expected output is produced.	*D1.1 Observation* Observed day-to-day operations. *Inspection*	D1.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient

Control Objectives	Control Procedures	Testing Performed	Test Results
and the accuracy and completeness of the processing is verified, according to established routines and procedures.		Reviewed a sample of checklists.	effectiveness to achieve this control objective.
	D1.2. Jobs are submitted by the operators based on the control room checklists and the completion of previous jobs to ensure that they are run at the proper time.	*D1.2 Observation* Observed day-to-day operations.	D1.2 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	D1.3. Certain critical jobs are automatically submitted by the system (i.e., end games) to ensure that they are run at the proper time.	*D1.3 Observation* Observed day-to-day operations. *Inspection* Reviewed system console logs.	D1.3 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	D1.4. Batch, hash and run-to-run totals are balanced to ensure the completeness of processing.	*D1.4 Observation* Observed day-to-day operations.	D1.4 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	D1.5. Job completion codes and other system messages are monitored and reviewed by control room operators to ensure the completeness of processing.	*D1.5 Inspection* Reviewed checklists, end-of-day reports, and system console logs. *Observation* Observed day-to-day operations.	D1.5 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.

Control Objectives	Control Procedures	Testing Performed	Test Results
D2. All expected output is produced and distributed to the appropriate recipients.	D2.1. Report and tape manifests are utilized to ensure that the delivery of output is controlled and timely.	D2.1 *Observation* Observed day-to-day operations. *Inspection* Reviewed report and tape manifests.	D2.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	D2.2. The receipt of sensitive output (i.e., on-line system transaction tapes) is validated through the signature of the recipient on the report and tape manifests.	D2.2 *Observation* Observed day-to-day operations. *Inspection* Reviewed report and tape manifests.	D2.2 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
D3. The tracking and reporting of processing problems is performed according to established procedures.	D3.1. The system console is monitored and job completion codes are reviewed to ensure that processing errors are detected and corrected in a timely manner.	*D3.1 Observation* Observed day-to-day operations. *Inspection* Reviewed samples of the Incident Report Database.	D3.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	D3.2. An Incident Report Directory is completed and any processing problems are reported and documented in an incident report.	*D3.2 Inspection* Reviewed sample incident reports for appropriateness. *Inquiry* Inquired of GTECH management.	D3.2 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	D3.3. Appropriate data processing and user personnel (i.e., Lottery and retailers) are notified in the event of a processing problems to ensure that all appropriate	*D3.3 Inquiry* Inquired of GTECH management.	D3.3 Based on the tests of operating effectiveness described, the controls are

Control Objectives	Control Procedures	Testing Performed	Test Results
	parties are informed of such problems.		operating with sufficient effectiveness to achieve this control objective.
	D3.4. GTECH management monitors the status of all problem resolution activities to ensure that the processing problems have been adequately addressed.	*D3.4 Inspection* Reviewed a sample of incident reports.	D3.4 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
E. Systems Development and Maintenance			
E1. Requests for development of new systems and modifications to existing systems are formally initiated, detailed specifications are developed and the specifications are approved through the appropriate channels.	E1.1. A Request for System Services (RFSS) form is used to document requests for development of new systems and modifications to existing systems.	*E1.1 Inspection* Reviewed a sample of RFSS documents for completeness and reviewed GTECH procedures.	E1.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	E1.2. Detailed specifications are developed jointly with Lottery personnel which include: source data and the medium of entry; output format, type of medium and report/screen layouts; system processing steps and logic; information security requirements; and required internal controls.	*E1.2 Inspection* Reviewed a sample of RFSS and other project documentation.	E1.2 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	E1.3. GTECH staff review final specifications with Lottery personnel and require their approval of the	*E1.3 Inspection* Reviewed a sample of RFSS and other	E1.3 Based on the tests of operating effectiveness

Control Objectives	Control Procedures	Testing Performed	Test Results
	specifications prior to continued project development.	project documentation.	described, the controls are operating with sufficient effectiveness to achieve this control objective.
E2. Development of new systems and modifications to existing systems are performed and monitored in a controlled environment.	E2.1. Development projects are prioritized with input from Lottery personnel and deviations from the schedule are communicated to Lottery personnel.	*E2.1 Inquiry* Inquired of GTECH management.	E2.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	E2.2. Development activities are performed by the GTECH programming group located out of state.	*E2.2 Inquiry* Inquired of GTECH management.	E2.2 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	E2.3. Development activities are performed in an environment separate from production processing.	*E2.3 Inquiry* Inquired of GTECH management.	E2.3 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	E2.4. New systems and modifications to existing systems are adequately documented.	*E2.4 Inquiry* Inquired of GTECH management.	E2.4 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.

Control Objectives	Control Procedures	Testing Performed	Test Results
	E2.5. New and modified program code is subject to review by programming supervisors.	*E2.5 Inquiry* Inquired of GTECH management. *Inspection* Reviewed a sample of Software Release Forms for evidence of review.	E2.5 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
E3. New systems and modifications to existing systems are adequately tested, approved and migrated into production.	E3.1. Software quality assurance personnel and test methodologies are utilized to ensure that program logic, user input procedures, interfaces to other systems, security features and reconciliation controls are adequately tested.	*E3.1 Inquiry* Inquired of GTECH management.	E3.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	E3.2. Test scripts are executed at the processing site by GTECH site personnel.	*E3.2 Inquiry* Inquired of GTECH management.	E3.2 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	E3.3. Lottery personnel participate in the development and execution of test scripts for user acceptance.	*E3.3 Inspection* Reviewed a sample of test scripts. *Inquiry* Inquired of GTECH management.	E3.3 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	E3.4. New systems and modifications to existing systems are placed into production after being authorized and approved for implementation by programming supervisors, site operations personnel, the Lottery and, where appropriate, software quality	*E3.4 Inspection* Reviewed a sample of Lottery approval memoranda. *Inquiry*	E3.4 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve

Control Objectives	Control Procedures	Testing Performed	Test Results
	assurance personnel.	Inquired of GTECH management.	this control objective.
	E3.5. Migration of new systems or modifications to existing systems, from test to production, is performed by GTECH site personnel independent of the programming group.	*E3.5 Inquiry* Inquired of GTECH management.	E3.5 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
F. Physical and Environmental Controls			
F.1. Physical access to computer and network facilities is restricted and monitored to ensure that access is only given to operations personnel and other appropriate personnel having a legitimate business concern.	F1.1. Physical access to the GTECH Pueblo facility is controlled through a card access and pass code system.	*F1.1 Observation* Observed access procedures for GTECH Pueblo facility.	F1.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	F1.2. Access to the GTECH Pueblo control room is restricted to appropriately authorized personnel.	*F1.2 Inspection* Reviewed the list of personnel who have access to the Pueblo control room.	F1.2 **Exception.** See exception described under Job Change in Section IV.
	F1.3. All visitors to the Pueblo facility must sign in. All visitors to the control room must sign in and are escorted by a GTECH employee.	*F1.3 Inspection* Reviewed listings from access system and compared to list supplied by GTECH to Lottery. Observed day-to-day operations. (Control processes involved in maintaining profiles in system which controls physical access	F1.3 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.

Control Objectives	Control Procedures	Testing Performed	Test Results
		is the responsibility of the Colorado Lottery.) *Observation* Observed visitor sign-in procedures.	
F2. GTECH systems and related equipment are environmentally protected to provide maximum availability.	F2.1. A Halon fire protection system is located in the Pueblo control room.	*F2.1 Observation* Observed the presence of fire suppression equipment within the Pueblo control room. *Inspection* Reviewed documentation of system testing and maintenance activities for adequacy.	F2.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	F2.2. Smoke detectors are located in the floor and ceiling of the Pueblo control room. These devices are connected to a central control panel located in the control room.	*F2.2 Observation* Observed the presence of the fire detection equipment within the control room. *Inspection* Reviewed documentation of system testing and maintenance activities for adequacy.	F2.2 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	F2.3. A constant temperature and humidity is maintained in the control room and is automatically monitored to ensure that the temperature is within operational limits.	*F2.3 Observation* Observed the presence of climate control equipment within the control room. *Inspection* Reviewed documentation of system	F2.3 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.

Control Objectives	Control Procedures	Testing Performed	Test Results
		testing and maintenance activities for adequacy.	
	F2.4. A Uninterrupted Power Supply (UPS) conditions the electrical current and provides backup power.	*F2.4 Observation* Observed the presence of UPS equipment at the Pueblo facility. *Inspection* Reviewed documentation of system testing and maintenance activities for adequacy.	F2.4 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	F2.5. A diesel generator is available to provide an emergency power supply.	*F2.5 Observation* Observed the presence of generator equipment at the Pueblo facility. *Inspection* Reviewed documentation of system testing and maintenance activities for adequacy.	F2.5 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
G. Backup and Disaster Recovery			
G1. Backup procedures and recovery plans have been developed to minimize interruptions in data processing.	G1.1. System backups are performed before and after every significant system software change to ensure that operating system processing problems can be corrected.	*G1.1 Inspection* Reviewed backup procedures and inquired of GTECH management.	G1.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	G1.2. The completion of backup procedures is recorded on the control room checklist to ensure that	*G1.2 Inspection* Reviewed control room checklists.	G1.2 Based on the tests of operating effectiveness

Control Objectives	Control Procedures	Testing Performed	Test Results
	these activities are performed on a timely basis and that a record of this process exists.		described, the controls are operating with sufficient effectiveness to achieve this control objective.
	G1.3. Dual processing is performed at the Pueblo facility in the event of a system malfunction on the primary system at the Pueblo facility to ensure that the processing of game information will not be interrupted.	*G1.3 Inspection* Reviewed console logs from both primary and secondary systems at the Pueblo facility.	G1.3 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	G1.4. Backup files are stored in a secure off-site location to ensure the recoverability of information.	*G1.4 Inspection* Reviewed off-site storage procedures and tape transfer manifests.	G1.4 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	G1.5. Procedures for recovery of processing exist.	*G1.5 Inspection* Reviewed the disaster recovery plan. (The extent of control procedures relating to the disaster recovery plan are specified by the Colorado Lottery).	G1.5 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
H. Data Network Operations			
H1. The data communications network is protected from unauthorized access and the design of the network provides for alternate	H1.1. The communication network is adequately supported by the communications manager to maintain the physical devices.	*Inquiry* Inquired of GTECH management. *Inspection* Reviewed GTECH organization charts.	H1.1 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.

Control Objectives	Control Procedures	Testing Performed	Test Results
routing in case of a failure in the primary routing			
	H1.2. Configuration changes to the central system communication software are performed by system programmers at the out of state software hub.	*H1.2 Inquiry* Inquired of GTECH management.	H1.2 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	H1.3. Changes to communication hardware and software are approved and tested by corporate support personnel followed by the GTECH Pueblo management and the communications manager prior to installation. Final approval is required by the Lottery Contract Administrator.	*H1.3 Inquiry* Inquired of GTECH management.	H1.3 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	H1.4. Communication equipment allowing the corporate office to gain access to GTECH Pueblo system is maintained off-line.	*H1.4 Inquiry* Inquired of GTECH management. *Inspection* Reviewed the status of communication equipment and verified that it was off-line.	H1.4 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	H1.5. Communication lines to on-line system terminals are dedicated lines.	*H1.5 Inquiry* Inquired of GTECH management.	H1.5 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	H1.6. GVT's utilize dial-up access.	*H1.6 Inquiry* Inquired of GTECH management.	H1.6 Based on the tests of operating effectiveness described, the controls are

Control Objectives	Control Procedures	Testing Performed	Test Results
		Inspection Reviewed the physical network diagram.	operating with sufficient effectiveness to achieve this control objective.
	H1.7. Communication hardware and documentation concerning the network are physically secured in the control room.	*H1.7 Observation* Observed the location of communication hardware and documentation.	H1.7 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	H1.8. Alternate physical and logical links connect the GTECH control room in Pueblo to key components of the network.	*H1.8 Inquiry* Inquired of GTECH management. (Control processes associated with the level of redundancy in the network is specified by the Colorado Lottery).	H1.8 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.
	H1.9. Firewall ensures only authorized access from outside the Pueblo raised floor.	*H1.9 Inspection* Reviewed the network topology. *Inspection* Reviewed firewall rules and monitoring of firewall logs.	H1.9 Based on the tests of operating effectiveness described, the controls are operating with sufficient effectiveness to achieve this control objective.

VIII. User Controls Consideration

User Control Considerations

The processing of Colorado Lottery gaming operations by GTECH Colorado and the controls at GTECH Colorado cover only a portion of the overall internal controls of the Information Technology aspects of the Colorado Lottery operations. It is not feasible for all control objectives relating to the processing of these transactions to be completely achieved by GTECH Colorado. Therefore, the internal controls within the Colorado Lottery must be evaluated taking into consideration controls in place at the GTECH Colorado location as well as the controls of Colorado Lottery.

This section highlights those internal control responsibilities that the Colorado Lottery and GTECH Colorado believe should be present and have considered in developing Colorado Lottery controls detailed in this report. In order for the Colorado Lottery and their auditors to rely on the controls reported herein, they must evaluate Colorado Lottery controls to determine if the following procedures are in place. The following list of Colorado Lottery controls is intended to address only those controls surrounding the IT related areas that relate to GTECH Colorado's involvement. This list does not purport to be and is not a complete listing of the controls that provide a basis for the assertions underlying the Colorado Lottery's financial statements. When reviewing the Colorado Lottery's control environment as it relates to the Colorado Lottery's financial statements the auditor should verify:

- The Colorado Lottery has controls in place to ensure that access rights within the gaming applications are properly authorized.
- The Colorado Lottery is responsible for the key monitoring activities relating to physical access to GTECH premises, logical access to key application, operating system and network resources.
- The Colorado Lottery is responsible for ensuring that adequate procedures are performed during on-line game draws including the accurate input of the winning numbers.
- The Colorado Lottery is responsible for approving and designing disaster and incident recovery procedures as they relate to Lottery gaming operations.

IX. Information Provided by Independent Public Accountants

Information Provided by Independent Public Accountants

This report on the controls placed in operation and tests of their operating effectiveness is intended to provide interested parties with information sufficient to understand the flow of processing of Lottery gaming activities and to rely on certain controls in place at GTECH Colorado. This report, when combined with the internal controls in place at the Colorado Lottery, is intended to permit an evaluation of the total internal controls in place for Lottery gaming activities of GTECH Colorado.

Our examination of the internal controls of GTECH Colorado was restricted to the control objectives specified by the Colorado Lottery and GTECH Colorado, and was not extended to controls in effect at the Colorado Lottery. The examination was performed in accordance with AICPA Statement on Auditing Standards No. 70, *Reports on the Processing of Transactions by Service Organizations*, of the American Institute of Certified Public Accountants. It is each interested party's responsibility to evaluate this information in relation to the internal controls in place at the Colorado Lottery in order to assess the total internal controls. If an effective Colorado Lottery internal control is not in place, GTECH Colorado's structure may not compensate for such weaknesses.

Testing of Effectiveness

Our tests of the effectiveness of GTECH Colorado's controls included in Section VI were designed to determine whether:

- the description of GTECH's controls present fairly, in all material respects, those aspects of Subsidiary Network Administrative Outsourcing's controls that may be relevant to a plan sponsor's internal controls;

- the controls were suitably designed to achieve the control objectives stated, if those controls were complied with satisfactorily and the Colorado Lottery applied the internal controls contemplated in the design of GTECH Colorado's controls which are set forth as "*User Control Considerations*" in Section VIII;

- the controls had been placed in operation as of June 30, 2002; and

- the controls were operating with sufficient effectiveness to provide reasonable, but not absolute, assurance that the control objectives stated were achieved during the period covered by our report.

Our tests of the effectiveness of controls included such tests as were considered necessary in the circumstances to evaluate whether those controls, and the extent of compliance with them, is sufficient to provide reasonable, but not absolute, assurance that the specified control objectives were achieved during the period from April 1, 2002 to June 30, 2002. Our tests of the operational effectiveness of controls were designed to cover a representative number of transactions throughout the period April 1, 2002 to June 30, 2002, for each of the controls listed in Section VII, that are designed to achieve the specified control objectives. In selecting particular tests of the operational effectiveness of controls, we considered (a) the nature of the items being tested, (b) availability of evidential matter, (c) the nature of the objectives to be achieved, (d) the assessed level of control risk and (e) the expected efficiency and effectiveness of the test. The testing period was established at three months primarily due to the engagement of the service auditors close to the report issuance date and certain controls were best tested through observation, inspection or reperformance.

Results of Testing Performed

The results of testing of the control environment and control activities were satisfactory to conclude that controls were operating effectively to provide reasonable, but not absolute, assurance that the control objectives were achieved during the period April 1, 2002 to June 30, 2002.

X. Glossary of Terms

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Glossary of Terms

The following summarizes acronyms and technical terms used throughout the report.

- **BFJ:** Backup Journal File.

- **DCL (Digital Command Language):** Standard command language for the VMS operating system on its VAX series.

- **DEC (Digital Equipment Corporation):** The trade name for Digital Equipment Corporation's earlier workstation and server products.

- **GEMS (Gaming Environment Management System):** Performs various administrative functions in support of the transaction processing applications.

- **GNA:** GTECH Network Architecture.

- **GTMS:** GTECH Transaction Management Subsystem.

- **GVT (GTECH Validation Terminal):** Terminals located at retailer premises used for instant ticket games.

- **ICS:** Internal Control System.

- **LAN (Local Area Network)**: A communications network that serves users within a confined geographical area. It is made up of servers, workstations, a network operating system and a communications link.

- **MFJ:** Master Journal File.

- **OLPM (On-line Product Management):** A subsystem within the on-line transaction processing system.

- **OLTP (On-line Transaction Processing):** Processing transactions as they are received by the computer.

- **Operating System:** The master control program that runs the computer.

- **OSI (Open Systems Interconnect) model:** ISO standard for a standard protocol to be used in worldwide network communications.

- **OTWF:** On-line Tickets and Winners File.

- **PowerBall Express:** Terminals that are located at retail locations and are used for on-line quick pick games.

- **PTM:** Product Transaction Master File.

- **RPC (Remote Procedure Calls):** A programming interface that allows one program to use the services of another program in a remote machine. The calling program sends a message and data to the remote program, which is executed, and results are passed back to the calling program.

- ***Server:*** Servers are high-speed machines that hold programs and data shared by network users.

- ***Spiffany:*** Terminals that are located at retail locations and are used for on-line/instant ticket games.

- ***SQL (Structured Query Language) server:*** A server that supports the SQL language used to interrogate and process data in the database server. All database systems designed for client/server environments support SQL. The SQL servers are used to hold on-line game data.

- ***Sybase:*** A database management system branded with the developing Company's name.

- ***TMIR:*** Transaction Master Inquiry Report.

- ***UNIX:*** A multi-user, multitasking operating system that is widely used as the master control program in workstations and especially servers.

- ***VAX (Virtual Address extension) environment:*** Represents a family of 32-bit computers (servers and/or workstations) from Compaq. The VAX Environment is the environment that houses the operating system and software that runs the key lottery gaming operations.

- ***VMS (Virtual Memory System):*** A multi-user, multitasking, virtual memory operating system for the VAX series from Digital. This operating system runs the software used to perform key gaming operations.

- ***Workstation:*** Workstations (clients) are the users' personal computers, which perform stand-alone processing and access the network servers as required.

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