STATE OF
NORTH CAROLINA

AUDIT OF THE INFORMATION SYSTEM GENERAL CONTROLS

AT

GASTON COLLEGE

DALLAS, NORTH CAROLINA

JUNE 2004

OFFICE OF THE STATE AUDITOR
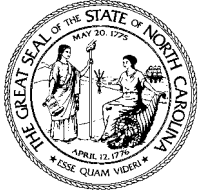
RALPH CAMPBELL, JR.

STATE AUDITOR

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AUDITOR'S TRANSMITTAL

The Honorable Michael F. Easley, Governor
Members of the North Carolina General Assembly
The Board of Directors of Gaston College
Dr. Patricia A. Skinner, President

Ladies and Gentlemen:

We have completed our information systems (IS) audit of Gaston College. The audit was conducted in accordance with *Government Auditing Standards* and *Information Systems Audit Standards*.

The primary objective of this audit was to evaluate IS general controls at Gaston College. The scope of our IS general controls audit included general security, access controls, program maintenance, systems software, physical security, and disaster recovery. Other IS general control topics were reviewed as considered necessary.

This report contains an executive summary that highlights the areas where Gaston College has performed satisfactorily and where improvements should be made.

We wish to express our appreciation to the staff at Gaston College for the courtesy, cooperation, and assistance provided to us during this audit.

North Carolina General Statutes require the State Auditor to make audit reports available to the public. Copies of audit reports issued by the Office of the State Auditor may be obtained through one of the options listed in the back of this report.

Respectfully submitted,

Ralph Campbell, Jr.

Ralph Campbell, Jr.
State Auditor

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We conducted an information system (IS) audit at Gaston College from April 4, 2003 - April 30, 2004. The primary objective of this audit was to evaluate the IS general controls in place during that period. Based on our objective, we report the following conclusions.

General security involves the establishment of a reasonable security program that addresses the general security of information resources. We found that NCCCS and Gaston College should adopt a baseline configuration for the critical operating system. *See Audit Finding 1, Baseline Configuration.*

The **access control** environment consists of access control software and information security policies and procedures. We reviewed the access controls for Gaston College's critical operating systems. We found several weaknesses in access controls. Due to the sensitive nature of the conditions found, we have conveyed these findings to management in a separate letter pursuant to the provision of *North Carolina General Statute* 147-64.6(c)(18).

Program maintenance primarily involves enhancements or changes needed to existing systems. Because the same procedures are used to patch and upgrade the critical application and the operating system, we indirectly tested program changes to the critical application in our test of system software maintenance.

Systems software is the collection of programs that drive the computer. The selection of systems software should be properly approved and the software should be maintained by the computer center. We found a significant weakness in systems software maintenance. Due to the sensitive nature of the condition found, we have conveyed this finding to management in a separate letter pursuant to the provision of *North Carolina General Statute* 147-64.6(c)(18).

Physical security primarily involves the inspection of the College's computer center for the controls that should reasonably secure the operations of the computer center from foreseeable and preventable threats from fire, water, electrical problems, and vandalism. Gaston College computer center is secure from foreseeable and preventable security and environmental threats. *We did not find any significant weaknesses in physical security.*

A complete **disaster recovery** plan that is tested periodically is necessary to enable the College to recover from an extended business interruption due to the destruction of the computer center or other College assets. Gaston College has a disaster recovery plan, however, they have not formally tested the plan. *See Audit Finding 2, Disaster Recovery Plan Test.*

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AUDIT OBJECTIVES, SCOPE, AND METHODOLOGY

OBJECTIVES

Under the *North Carolina General Statutes* Chapter 147-64.6, the State Auditor is responsible for examining and evaluating the adequacy of operating and administrative procedures and practices, systems of accounting, and other elements of State agencies. This IS audit was designed to ascertain the effectiveness of general controls at Gaston College.

SCOPE

General controls govern the operation and management of computer processing activities. The scope of our IS general controls audit was to review general security issues, access controls, program maintenance, systems software, physical security, operations procedures, and disaster recovery which directly affect Gaston College computing operations. Other IS general control topics were reviewed as considered necessary.

METHODOLOGY

We audited policies and procedures, used questionnaires to interview key administrators and other personnel, developed a program to generate information from the critical operating systems to examine system configurations, toured the computer facility, tested on-line system controls, reviewed appropriate technical literature, reviewed computer generated reports, and used security evaluation software in our audit of controls. We conducted our audit in accordance with the standards applicable to performance audits contained in *Government Auditing Standards* issued by the Comptroller General of the United States and *Information Systems Audit Standards* issued by the Information Systems Audit and Control Association. [1]

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1 In 1992 the State created the Information Resource Management Commission to provide statewide coordination of information technology resources planning. The IRMC provides state enterprise IT leadership including increased emphasis and oversight for strategic information technology planning and management; policy development; technical architecture; and project certification. Pursuant to *North Carolina General Statute* 147-33.78 numerous state officials serve on the IRMC including four members of the Council of State who are appointed by the Governor. The State Auditor has been appointed a member of the IRMC and elected as chair of the IRMC by its members.

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Gaston College, located in Dallas, North Carolina, was granted a charter in 1963 and began its first classes in September 1964. Gaston College receives its accreditation from the Southern Association of Colleges and Schools to award degrees, certificates and diplomas. The mission of Gaston College is to provide high quality educational programs and services to the citizens of Gaston and Lincoln Counties. The College offers Associate of Arts degrees, Associate of Applied Science degrees, diplomas, and certificates in curriculum programs, corporate & community education, small business, basic skills, AHS, GED, personal enrichment, business & industry, workplace skills, and high-end vendor training for certification.

The IT division at Gaston College is referred to as Technology Services. A Chief Technology Officer, who reports directly to the President, heads the division. The mission of Technology Services is to support the hardware and software needs of Gaston College, and to ensure that the data and voice network is reliable and secure. In addition to implementing purchased technologies for academic use, the division provides general help desk services for faculty and staff, as well as support for all administrative computing systems.

The functions of Technology Services are to:

- Develop, maintain, and support all institutional software packages.

- Purchase, install, and maintain all computer hardware.

- Purchase, install, and provide front line support to all common software packages including: Windows O/S, email, browsers, Word, and Excel.

- Develop, maintain, and support Internet/Web services.

- Design, purchase, install, and support institutional infrastructures such as telephone & voice mail, and networking systems.

- Integrate third-party software packages with administrative computing.

- Coordinate campus-wide purchase of computer hardware and software.

- Develop and conduct training sessions for faculty and staff.

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AUDIT RESULTS AND AUDITEE RESPONSES

The following audit results reflect the areas where Gaston College has performed satisfactorily and where recommendations have been made for improvement.

GENERAL SECURITY ISSUES

General security issues involve the maintenance of a sound security management structure. A sound security management structure should include a method of classifying and establishing ownership of resources, proper segregation of duties, a security organization and resources, policies regarding access to the computer systems and a security education program.

AUDIT FINDING 1: BASELINE CONFIGURATION

The North Carolina Community College System (NCCCS) has not provided Gaston College with a baseline configuration for securing the critical operating system. The critical operating system may not be secure from commonly known vulnerabilities because unauthorized and unidentifable system parameters and services may be activated on the system. In order to establish an effective security structure, a baseline configuration is a key component, which should be included in an organization's security program. A baseline configuration measures system parameters for compliance with organizational security policies and procedures. Having an established baseline allows the College to only enable authorized and identifiable system parameters and services on the critical system, provides a checkpoint to keep track of changes made to configuration items, and keeps system parameters at a consistent level to ensure adequate control.

Recommendation: NCCCS and Gaston College's management should develop a baseline configuration for the critical operating system to ensure that the organization's overall approach to security and internal control is implemented on the critcal operating system.

Auditee's Response: The Director of Administrative Systems has contacted NCCCS, who responded that they are working on establishing a baseline configuration for all colleges to ensure adequate controls. When the baseline is in place, Gaston College will implement accordingly.

ACCESS CONTROLS

The access control environment consists of access control software and information security policies and procedures. An individual or a group with responsibility for security administration should develop information security policies, perform account administration functions and establish procedures to monitor and report any security violations. We reviewed the access controls for Gaston College's critical operating systems. We found several significant weaknesses in access controls. Due to the sensitive nature of the conditions found, we have conveyed these findings to management in a separate letter pursuant to the provision of *North Carolina General Statute* 147-64.6(c)(18).

PROGRAM MAINTENANCE

Program maintenance consists of making changes to existing application systems. Programmers should follow program change procedures to ensure that changes are authorized, made according to specifications, properly tested, and thoroughly documented. Application programmers should be restricted to a test environment to ensure that all changes to production resources are tested and approved before moving the changes into production. Changes to application system production programs should be logged and monitored by management. Because the same procedures are used to patch and upgrade the critical application and the operating system, we indirectly tested program changes to the critical application in our test of system software maintenance.

SYSTEMS SOFTWARE

Systems software is the collection of programs that the computer center uses to run the computer and support the application systems. This software includes the operating system, utility programs, compilers, database management systems and other programs. The systems programmers have responsibility for the installation and testing of upgrades to the system software when received. We found a significant weakness in systems software maintenance. Due to the sensitive nature of the condition found, we have conveyed this finding to management in a separate letter pursuant to the provision of *North Carolina General Statute* 147-64.6(c)(18).

PHYSICAL SECURITY

Controls over physical security are designed to protect a computer center from service interruptions resulting from fire, water, electrical problems, vandalism, and other causes. Gaston College computer center is secure from foreseeable and preventable security and environmental threats. *We did not find any significant weaknesses in physical security.*

DISASTER RECOVERY

Disasters such as fire and flood can destroy a computer service center and leave its users without computer processing support. Without computer processing, many college services would grind to a halt. To reduce this risk, computer service centers develop disaster recovery plans. Disaster recovery procedures should be tested periodically to ensure the recoverability of the data center. Our audit identified one significant weakness in the disaster recovery planning.

AUDIT FINDING 2: DISASTER RECOVERY PLAN TEST

Gaston College has an adequate disaster recovery plan to ensure the resumption of computer systems during adverse circumstances. However, the disaster recovery plan has not been tested. A disaster recovery plan should be tested to ensure that the plan is effective.

Recommendation: Gaston College should should test the plan at least on a yearly basis.

Auditee's Response: On several occasions, portions of the College's Disaster Recovery Plan have been used to recover from real-world emergencies, and the events documented. To show utilization of the Disaster Recovery Plan in the future, an event log has been setup to officially record actions taken in unforeseen events of this nature. Testable scenarios will be developed and tested to prove the continued viability of Gaston College's Disaster Recovery Plan.

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DISTRIBUTION OF AUDIT REPORT

In accordance with General Statutes 147-64.5 and 147-64.6(c)(14), copies of this report have been distributed to the public officials listed below. Additional copies are provided to other legislators, state officials, the press, and the general public upon request.

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Dr. Patricia A. Skinner	President, Gaston College

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