



STATE OF NORTH CAROLINA

AUDIT OF THE INFORMATION SYSTEMS

GENERAL CONTROLS

EDGECOMBE COMMUNITY COLLEGE

JUNE 2007

OFFICE OF THE STATE AUDITOR

LESLIE MERRITT, JR., CPA, CFP

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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 Edgecombe Community College
Dr. Deborah L. Lamm, President

Ladies and Gentlemen:

We have completed our audit of Edgecombe Community College (ECC). This audit was conducted during the period from May 8, 2007, through June 12, 2007. The audit was conducted in accordance with *Government Auditing Standards* and *Information Systems Audit Standards*.

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

This report contains an executive summary and audit results which detail the areas where ECC has performed satisfactorily relevant to our audit scope, where improvements should be made, and where further study is necessary.

We wish to express our appreciation to the staff of ECC 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,

A handwritten signature in black ink that reads "Leslie W. Merritt, Jr." in a cursive script.

Leslie Merritt, Jr., CPA, CFP
State Auditor

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EXECUTIVE SUMMARY

We conducted an Information Systems (IS) audit at the Edgecombe Community College (ECC) from May 8, 2007, through June 12, 2007. 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. ECC has established a reasonable security program that addresses the general security of information resources. We did identify a significant weakness in general security during our audit. *See Audit Finding 1, IT Security Policies and Procedures.*

The **access control** environment consists of access control software and information security policies and procedures. We found several weaknesses in access controls. Due to the sensitive nature of the conditions found in these weaknesses, we have conveyed these findings to management in a separate letter pursuant to the provision of North Carolina G.S. 147-64.6(c)(18).

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 did not identify any significant weaknesses in systems software during our audit.*

Physical security primarily involves the inspection of the agency'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. We did identify a significant weakness in the physical security. *See Audit Finding 2, Physical Security of the Computer Processing Facility.*

A complete **disaster recovery** plan that is tested periodically is necessary to enable ECC to recover from an extended business interruption due to the destruction of the computer center or other ECC assets. Our audit did note a weakness in disaster recovery. *See Audit Finding 3, Resumption of Computer Systems.*

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AUDIT OBJECTIVES, SCOPE, AND METHODOLOGY

OBJECTIVES

Under the *North Carolina General Statutes* 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. IS general control audits are examinations of controls which effect the overall organization and operation of the IS function. This IS audit was designed to ascertain the effectiveness of general controls at Edgecombe CC.

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, systems software, physical security, and disaster recovery which directly affect Edgecombe Community College's computing operations. Other IS general control topics were reviewed as considered necessary.

METHODOLOGY

We audited policies and procedures, interviewed key administrators and other personnel, examined 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 general 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.

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BACKGROUND INFORMATION

Edgecombe Community College, located in Tarboro, NC and Rocky Mount, NC, was founded in 1967. The Southern Association of Schools and Colleges accredits Edgecombe Community College to award certificates, diplomas, and associate degrees. The College also offers post-secondary vocational, technical, college transfer and continuing education. The mission of Edgecombe Community College is to fulfill the educational, cultural, and training needs of adults and of business, industry, and public service agencies in the service area of the college. The College attempts to fulfill its mission by providing:

1. A variety of curriculum vocational, technical, and college transfer programs that offer certificates, diplomas, or associate degrees and that reflect the changing needs of business, industry, and professional and public service agencies.
2. Continuing education programs offering opportunities that reflect the changing needs of business, industry, and professional and public service agencies.
3. The opportunity for adults to complete elementary and secondary school levels by offering literacy education.
4. General interest courses that meet adult education and community service needs.
5. Cultural programs and educational services for community enrichment.
6. Effective student services to assist students in meeting personal and educational goals.
7. Sound management practices and systematic planning.
8. Educational and employment opportunities without regard to race, gender, creed, color, or national origin.

The IT division at Edgecombe Community College is referred to as the Computer Services division of the College. The Computer Services division is headed by a Director of Computer Services, who reports to the Vice President of Administrative Services on tactical issues (budgeting and expenditures) and to the President on strategic issues.

The Director of Computer Services sits on the Executive Council and plans and directs the activities of the Computer Services staff to implement the goals and objectives documented in the College's Information Technology Plan. The Director of Computer Services makes decisions based on internal input from all sectors of the College as well as technical and policy directives from the NCCCS state office. The mission of Computer Services is to support the College's Mission Statement. The function of the Computer Services division is to plan, implement, protect, operate, and manage the total administrative IT resources of the College.

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AUDIT RESULTS AND AUDITEE RESPONSES

The following audit results reflect the areas where ECC 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: IT SECURITY POLICIES AND PROCEDURES

Edgecombe Community College (ECC) has not adopted formal information technology (IT) standards to help them address all critical areas of their IT security environment. The following critical policies and procedures were not addressed in their security program:

- ECC does not monitor its current system configuration against an approved baseline for system security that will assist the College in identifying unauthorized changes to the system. Without a baseline configuration for securing the critical operating system, the operating system may not be secure from commonly known vulnerabilities.

ECC should assume full responsibility for developing a framework policy, which establishes the organization's overall approach to security and internal control. The policy should comply with overall business objectives and be aimed at decreasing risks through preventive measures, timely identification of irregularities, limitation of losses and timely restoration.

Recommendation: Edgecombe Community College should develop an approved baseline for system security. North Carolina Community College System (NCCCS) is in the process of developing a baseline configuration that is scheduled for completion in July 2007. ECC should use the completed NCCCS baseline as a guideline for minimum security configurations, and document any differences between the College's baseline and the NCCCS baseline. ECC should develop procedures to monitor their system configuration against the college's developed baseline settings to detect any unauthorized changes to the system.

Auditee's Response: We concur with the findings. We look forward to the announced issuance of the "baseline system configuration" from the State Office of the North Carolina Community College System that will provide additional needed guidance to the local IT staff to address those identified system configuration weaknesses that are currently common to most all North Carolina Community Colleges.

ACCESS CONTROLS

The most important information security safeguard that ECC has is its access controls. The access controls environment consists of ECC's 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

AUDIT RESULTS AND AUDITEE RESPONSES (CONTINUED)

functions and establish procedures to monitor and report any security violations. We noted a number of weaknesses in access controls. Due to the sensitive nature of the conditions found in the weaknesses, we have conveyed these findings to management in a separate letter pursuant to the provision of North Carolina G.S. 147-64.6(c)(18).

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. Systems software changes should be properly documented and approved. Our audit did not identify any significant weaknesses in system software.

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. The physical security controls ensure that the computer service center is reasonably secure.

AUDIT FINDING 2: PHYSICAL SECURITY OF THE COMPUTER PROCESSING FACILITY

The computer room is not reasonably secure from foreseeable and preventable threats to its physical continuity. We found the following physical security weakness:

- Exterior access to the computer area is not properly secured from unauthorized entry. The windows to the computer area are vulnerable because they do not have the appropriate protection that would prevent unauthorized physical access. Because the critical operating systems, which host the financial and student information, reside in this computer room, unauthorized personnel could directly access the main console and modify, delete, and corrupt data, or interrupt ECC's computer processing capabilities.

Appropriate physical security and access control measures should be established for computer processing facilities in conformance with the general security policy. Access should be restricted to individuals who have been authorized to gain such access. Management should also assure that sufficient measures are put in place and maintained for protection against environmental factors (e.g. fire, dust, power, excessive heat and humidity).

Recommendation: Edgecombe Community College should develop procedures to ensure that the computer room is always secure from unauthorized personnel. Adding metal bars across the window and fiber board would secure the computer facility from outside entry.

AUDIT RESULTS AND AUDITEE RESPONSES (CONCLUDED)

Auditee's Response: We concur with the findings. A number of the cited weaknesses have already been addressed and the college will address the remaining issues as soon as practical.

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 3: RESUMPTION OF COMPUTER SYSTEMS

Edgecombe Community College has a disaster recovery plan to ensure the resumption of computer systems during adverse circumstances. However, the disaster recovery plan is incomplete. The plan does not include the following critical components:

- Identification of key personnel and their assignments during the restoration of processing.

In the event of a disaster, the aforementioned components are necessary to ensure the proper recovery of the computer resources. Also, a disaster recovery plan should be tested to ensure that the plan is effective. Management should ensure that a written plan is developed and maintained in accordance with the overall framework for restoring critical information services in the event of a major failure. The disaster recovery plan should minimize the effect of disruptions. Procedures should require that the plan be reviewed and revised annually or when significant changes to the College's operation occur.

Recommendation: Edgecombe Community College should include all the aforementioned critical components in their plan and should test the plan at least on a yearly basis.

Auditee's Response: We concur with the findings. A number of the cited weaknesses have already been addressed and the college will address the remaining issues as soon as practical.

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