



# **STATE OF NORTH CAROLINA**

**AUDIT OF THE INFORMATION SYSTEM GENERAL CONTROLS**

**AT**

**ALAMANCE COMMUNITY COLLEGE**

**GRAHAM, NORTH CAROLINA**

**JUNE 2004**

**OFFICE OF THE STATE AUDITOR**

**RALPH CAMPBELL, JR.**

**STATE AUDITOR**

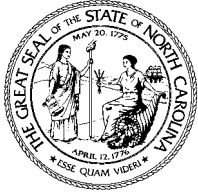
**AUDIT OF THE INFORMATION SYSTEM GENERAL CONTROLS**

**AT**

**ALAMANCE COMMUNITY COLLEGE**

**GRAHAM, NORTH CAROLINA**

**JUNE 2004**



Ralph Campbell, Jr.  
State Auditor

STATE OF NORTH CAROLINA  
Office of the State Auditor

2 S. Salisbury Street  
20601 Mail Service Center  
Raleigh, NC 27699-0601  
Telephone: (919) 807-7500  
Fax: (919) 807-7647  
Internet <http://www.osa.state.nc.us>

---

**AUDITOR'S TRANSMITTAL**

---

The Honorable Michael F. Easley, Governor  
Members of the North Carolina General Assembly  
The Board of Directors of Alamance Community College  
Dr. Martin H. Nadelman, President

Ladies and Gentlemen:

We have completed our information systems (IS) audit of Alamance Community 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 Alamance Community 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 Alamance Community College has performed satisfactorily and where improvements should be made.

We wish to express our appreciation to the staff at Alamance Community 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.  
State Auditor

## TABLE OF CONTENTS

---

	PAGE
EXECUTIVE SUMMARY .....	1
AUDIT OBJECTIVES, SCOPE, AND METHODOLOGY .....	3
BACKGROUND INFORMATION .....	5
AUDIT RESULTS AND AUDITEE RESPONSES .....	7
DISTRIBUTION OF AUDIT REPORT.....	11

## EXECUTIVE SUMMARY

---

We conducted an information system (IS) audit at Alamance Community College (CC) 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 Alamance Community College should adopt formal standards for information technology (IT) to improve the IT Security Policies and Procedures. *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 reviewed the access controls for Alamance Community 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. Alamance Community College computer center is not secure from foreseeable and preventable security and environmental threats. *See Audit Finding 2, Physical Security of the Computer Processing Facility.*

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. Alamance Community College does not have a Disaster Recovery Plan. *See Audit Finding 3, Resumption of Computer Systems.*

[ This Page Left Blank Intentionally ]

## 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 Alamance Community 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 Alamance Community 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.<sup>1</sup>

---

<sup>1</sup> 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.

[ This Page Left Blank Intentionally ]



## **BACKGROUND INFORMATION**

---

Alamance Community College, located in Graham NC, was founded in 1958. The Southern Association of Colleges accredits the College to award degrees, certificates and diplomas. The mission of Alamance Community College is to provide educational opportunities for the people of North Carolina. The College offers education and training in the following areas: college transfer, Vocational, and Technical and is accredited to award Associate of Arts, Associate of Applied Science, and Associate of Science degrees.

The IT division at Alamance Community College is referred to as the Information Systems division of the College. A systems administrator, who reports to the Vice President of Administrative and Fiscal Services, heads the Information Systems division. The mission of Information Systems is to support the overall educational mission of the College. The function of the Information Systems division is to support academic and administrative computers.

[ This Page Left Blank Intentionally ]

## AUDIT RESULTS AND AUDITEE RESPONSES

---

The following audit results reflect the areas where Alamance Community 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: IT SECURITY POLICIES AND PROCEDURES***

North Carolina Community College System (NCCCS) and Alamance Community College's (CC) management 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:

- Alamance CC has no written standards or policies and procedures regarding the monitoring of critical operating systems and servers, organization-wide security, super user access, how to respond to security threats, and how users should securely use the networks. Without adding these critical components to a security program, management has not appropriately communicated to the Alamance CC staff its overall approach to security and internal control in these aforementioned critical areas.
- Alamance CC users are not required to document that they understand the existing security policies and procedures and the proper use of the network. Consequently, users may be able to avoid penalties associated with violating the existing security policies and improperly using the networks because no document exist to show that users were made aware of these policies and restrictions.
- NCCCS has not provided Alamance CC with a baseline configuration for securing the critical operating system. The critical operating systems may not be secure from commonly known vulnerabilities.
- Alamance CC has not performed a risk assessment of their critical operations. Without a risk assessment, management has not determined which areas are deemed critical and how to prioritize resources and time to ensure that the critical areas remain effective.

NCCCS and Alamance CC's management 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

## AUDIT RESULTS AND AUDITEE RESPONSES (CONTINUED)

---

of losses and timely restoration. In addition, management should ensure that this policy specifies the purpose and objectives, the management structure, the scope within the organization, the assignment of responsibilities for implementation and the definition of penalties and disciplinary actions associated with failing to comply with security and internal control policies.

*Recommendation:* Management at Alamance CC need to work with NCCCS to develop and adopt a set of formal standards to ensure that all critical general security issues are addressed in their policies and procedures. Also, they should have a mechanism in place to periodically review standards for any new critical areas that should be addressed and include policies and procedures regarding these areas in Alamance's security policies.

*Auditee's Response:* We agree that we need to develop and adopt a more formal set of security policies and a mechanism for annual review of those policies. Because we are in transition between IIPS and CIS, our priority will be developing policies that protect the College Information System but we will extend as many of those policies as possible to the operation of IIPS.

### 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 Alamance Community 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.

## AUDIT RESULTS AND AUDITEE RESPONSES (CONTINUED)

### 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.

#### ***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 weaknesses:

- Access to the offsite storage area and the computer area are not restricted to only authorized personnel. As a result, the physical security over Alamance back-up tapes and computing resources is weakened and could allow unauthorized tampering of the data stored on the back-up tapes and unauthorized access to computer hardware.
- Alamance CC's computer room is not equipped with smoke detectors, automated fire suppression system, or hand-pulled fire alarms. Therefore, Alamance CC is not protected from an environmental hazard, such as, fire.

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:* Alamance CC should develop procedures to ensure that the computer room is always secure from unauthorized personnel, and equip the computer room with smoke detectors.

*Auditee's Response:* The current location of the IIPS and CIS hosts is physically secure and environmentally correct. The future location in the administrative building (currently under construction) will also be physically secure and environmentally correct. However, the area

## **AUDIT RESULTS AND AUDITEE RESPONSES (CONCLUDED)**

---

where our back-up tapes are stored is only partially secure and is not environmentally correct. Alamance personnel will investigate and implement changes in our tape storage procedures that correct that shortcoming.

### **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***

Alamance CC does not have a disaster recovery plan to ensure the resumption of computer systems during adverse circumstances. In the event of a disaster, there is no plan in place to determine how the computer systems will be restored. Alamance CC would not be able to process financial transactions or student record information. 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.

*Recommendation:* Alamance CC should develop a disaster recovery plan and test it on a yearly basis.

*Auditee's Response:* Although our Disaster Recovery Plan is documented poorly and has never been tested, it does exist. In the event of a major failure, we will transport our daily backup tapes to an NCCCS facility in Raleigh and utilize an IBM system provided by NCCCS to process financial transactions and student record information. Recognizing the security problems associated with conducting transactions over a wide area network, Alamance CC IS management has requested funds to purchase and install a used AIX system on our premises for disaster recovery purposes. This year's administrative budget cuts precluded that purchase. When funds become available, we will implement and document a Disaster Recovery Plan utilizing an on-site system.

## **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.

### **EXECUTIVE BRANCH**

The Honorable Michael F. Easley  
The Honorable Beverly M. Perdue  
The Honorable Richard H. Moore  
The Honorable Roy A. Cooper, III  
Mr. David T. McCoy  
Mr. Robert L. Powell  
Mr. Martin Lancaster

Dr. Martin H. Nadelman

Governor of North Carolina  
Lieutenant Governor of North Carolina  
State Treasurer  
Attorney General  
State Budget Officer  
State Controller  
President  
The North Carolina Community College System  
President, Alamance Community College

### **LEGISLATIVE BRANCH**

#### **Appointees to the Joint Legislative Commission on Governmental Operations**

President Pro Tempore  
Senator Marc Basnight, Co-Chair  
Senator Charles W. Albertson  
Senator Patrick J. Ballantine  
Senator Daniel G. Clodfelter  
Senator Walter H. Dalton  
Senator Charlie S. Dannelly  
Senator James Forrester  
Senator Linda Garrou  
Senator Wilbur P. Gulley  
Senator Fletcher L. Hartsell, Jr.  
Senator David W. Hoyle  
Senator Ellie Kinnaird  
Senator Jeanne H. Lucas  
Senator Stephen M. Metcalf  
Senator Anthony E. Rand  
Senator Eric M. Reeves  
Senator Robert A. Rucho  
Senator R. C. Soles, Jr.  
Senator Scott Thomas

Speaker of the House  
Representative James B. Black, Co-Chair  
Representative Richard T. Morgan, Co-Chair  
Representative Martha B. Alexander  
Representative Rex L. Baker  
Representative Bobby H. Barbee, Sr.  
Representative Harold J. Brubaker  
Representative Debbie A. Clary  
Representative E. Nelson Cole  
Representative James W. Crawford, Jr.  
Representative William T. Culpepper, III  
Representative W. Pete Cunningham  
Representative W. Robert Grady  
Representative Joe Hackney  
Representative Julia C. Howard  
Representative Joe L. Kiser  
Representative Edd Nye  
Representative William C. Owens, Jr.  
Representative Wilma M. Sherrill  
Representative Thomas E. Wright

### **Other Legislative Officials**

Mr. James D. Johnson

Director, Fiscal Research Division

### **Other Officials**

Chairman and Members of the Information Resource Management Commission

## ORDERING INFORMATION

---

Copies of this report may be obtained by contacting the:

Office of the State Auditor  
State of North Carolina  
2 South Salisbury Street  
20601 Mail Service Center  
Raleigh, North Carolina 27699-0601

Internet: <http://www.ncauditor.net>

Telephone: 919/807-7500

Facsimile: 919/807-7647