



STATE OF NORTH CAROLINA

AUDIT OF THE INFORMATION SYSTEM GENERAL CONTROLS

AT

BLADEN COMMUNITY COLLEGE

DUBLIN, NORTH CAROLINA

JUNE 2004

OFFICE OF THE STATE AUDITOR

RALPH CAMPBELL, JR.

STATE AUDITOR

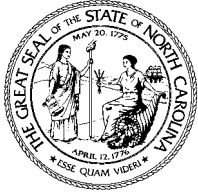
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AUDITOR'S TRANSMITTAL

The Honorable Michael F. Easley, Governor
Members of the North Carolina General Assembly
The Board of Directors of Bladen Community College
Dr. Darrell Page, President

Ladies and Gentlemen:

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

We wish to express our appreciation to the staff at Bladen 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,

A handwritten signature in black ink that reads "Ralph Campbell, Jr." in a cursive script.

Ralph Campbell, Jr.
State Auditor

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EXECUTIVE SUMMARY

We conducted an information system (IS) audit at Bladen 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 Bladen 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 Bladen 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. Bladen Community College computer center is secure from foreseeable and preventable security and environmental threats. *We did not detect 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. We found two significant weaknesses in disaster recovery. Bladen Community College has a disaster recovery plan, however, it is inadequate and incomplete. *See Audit Finding 2, Resumption of Computer Systems.*

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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 Bladen 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 Bladen 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.¹

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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BACKGROUND INFORMATION

Bladen Community College, located in Dublin, North Carolina, was established as Bladen Technical Institute in 1967. The College formally opened on December 16, 1967. The College is accredited by the Southern Association of Colleges and Schools and received its initial accreditation in 1976 to award degrees, certificates, and diplomas. Bladen Community College is dedicated to the educational and cultural enrichment of the people of Bladen and surrounding counties. The College operates as a constituent institution to the North Carolina Community College System and is committed to opening the door to opportunity for citizens seeking to improve their lives and well-being. The College offers classes and programs in two primary areas: Curriculum and Continuing Education.

The Information Systems (IS) division at Bladen Community College is headed by the System Administrator, who reports directly to the Vice President of Business and Fiscal Affairs. The mission of the IS division is to the support infrastructure needed to advance the educational goals of the College and meet the administrative computing needs of the College. The function of the IS division is carried out through the support for the network, hardware, and software needs of the College.

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AUDIT RESULTS AND AUDITEE RESPONSES

The following audit results reflect the areas where Bladen 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 Bladen 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:

- Bladen CC has no written standards or policies and procedures regarding the monitoring of critical operating systems and servers, and how to respond to security threats. They also do not have policies on group assignments and procedures that should be followed by the super users of the system. Without adding these critical components to a security program, management has not appropriately communicated to the Bladen CC IT staff its overall approach to security and internal control in these aforementioned critical areas.
- Bladen CC is not requiring users to sign that they read and understood the security sections stated in their IT security policies. Without requiring this from users, Bladen CC may have difficulty in enforcing penalties associated with breaching security. Users may claim that they did not read or understand the security policies and the associated penalties.
- NCCCS has not provided Bladen CC with a baseline configuration for securing the critical operating system. The critical operating systems may not be secure from commonly known vulnerabilities.

NCCCS and Bladen 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 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.

AUDIT RESULTS AND AUDITEE RESPONSES (CONTINUED)

Recommendation: Management at Bladen 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 Bladen's security policies. Also, Bladen should require users to sign statements to ensure that they have read and understood the security policies and procedures and the associated penalties for breaching security.

Auditee's Response: College Information staff are working with other community colleges and the NCCCS office to develop a set of formal standards to ensure that all critical general security issues are addressed in the College IT policies and procedures, also that users have read and understand the security sections stated in the College's IT policies.

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 Bladen 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.

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

AUDIT RESULTS AND AUDITEE RESPONSES (CONTINUED)

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. Bladen Community College computer center is secure from foreseeable and preventable security and environmental threats. *We did not detect 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: RESUMPTION OF COMPUTER SYSTEMS

Bladen CC has a disaster recovery plan to ensure the resumption of computer systems during adverse circumstances. However, the disaster recovery plan is incomplete and has not been tested. The plan does not include the following critical components:

- Identification of key personnel and their assignments during the restoration of processing.
- Alternate user department procedures to manage their workloads until processing resumes.
- An inventory of equipment, special stock and arrangements to acquire replacement equipment.

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.

AUDIT RESULTS AND AUDITEE RESPONSES (CONCLUDED)

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

Auditee's Response: The College has updated the disaster recovery plan to include identification of key personnel and their assignments during restoration of processing after a disaster. The College has implemented additional procedures to assist users in managing their workload until processing resumes. The College included in their disaster recovery plans a key contact list for written contracts for server and network support. The College will test the disaster recovery plan with assistance from NCCCS on a yearly basis.

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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Mr. Robert L. Powell
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