STATE OF NORTH CAROLINA

AUDIT OF THE INFORMATION SYSTEM GENERAL CONTROLS

AT

BRUNSWICK COMMUNITY COLLEGE

SUPPLY, 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 Brunswick Community College
Dr. W. Michael Reaves, President

Ladies and Gentlemen:

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

We wish to express our appreciation to the staff at Brunswick 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

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We conducted an information system (IS) audit at Brunswick 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 Brunswick 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 Brunswick 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. Brunswick Community College Computer Center is secure from foreseeable and preventable security and environmental threats. *We found no 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. Brunswick Community College has an adequate Disaster Recovery Plan. *We found no significant weaknesses in disaster recovery.*

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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 Brunswick 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 Brunswick 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]

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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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Brunswick Community College was established by the North Carolina Legislature in July 1979. It was chartered as Brunswick Technical Institute. The College was initially accredited by the Commission on Colleges of the Southern Association of Colleges and Schools in 1983 and was reaffirmed for accreditation in 1998. Brunswick Community College is located in the southeastern tip of North Carolina in Brunswick County, midway between Wilmington, North Carolina, and Myrtle Beach, South Carolina, on U.S. 17. The ultimate goal of the College is to provide accessible and affordable programs and services that meet the educational and cultural needs of the community and to provide opportunities for individuals to be successful. Brunswick Community College offers two-year associate degrees in arts, science, and applied science. It also offers certificate and diploma programs.

The Information Services Division's mission at Brunswick Community College is to provide computer services to the College's students, faculty, and staff. This Division is headed by the Vice President of Information Services, who reports directly to the President. The function of the Information Services Division is to provide computer technical support services for Brunswick Community College. Its staff provides individual and group software training opportunities. In addition, Information Services staff provides updated, adequate computer lab space to accommodate both instructional and open computer laboratory functions.

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AUDIT RESULTS AND AUDITEE RESPONSES

The following audit results reflect the areas where Brunswick 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 Brunswick 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:

- Brunswick CC has no written standards or policies and procedures regarding organizational–wide security, group assignments and re-assignments, 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 Brunswick CC staff its overall approach to security and internal control in these aforementioned critical areas.

- Brunswick 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 Brunswick CC with a baseline configuration for securing the critical operating system. The critical operating systems may not be secure from commonly known vulnerabilities.

- Brunswick 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.

- Brunswick CC has not provided IT staff with adequate training opportunities specific to operating system administration, networking administration, and overall IT security in order that IT staff can augment existing knowledge, skills, and experience and remain current in the increasingly complex role of providing services, securing systems, and optimizing system performance.

NCCCS and Brunswick 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. Furthermore, management should ensure that training opportunities are made available to appropriate staff to meet their job responsibilities.

Recommendation: Management at Brunswick 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 Brunswick's security policies. Finally, management needs to make available to the IT staff training opportunities that will allow the staff to meet their job responsibilities.

Auditee's Response: In order to remedy this situation, written procedures regarding system and network access are in the process of development will be forwarded to the proper committees for approval in the next few months. We are developing a method to document that users understand existing policies and procedures regarding use of network. Management will perform a risk assessment of critical operations on a regular basis. Management will adequately fund and support additional training specific to system administration, network administration, and system security.

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 Brunswick 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 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. Brunswick Community College computer center is secure from foreseeable and preventable security and environmental threats. *We found no 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. Brunswick Community College has an adequate Disaster Recovery Plan. *We found no significant weaknesses in disaster recovery.*

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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. W. Michael Reaves	President, Brunswick Community College

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