



STATE OF NORTH CAROLINA

AUDIT OF THE INFORMATION SYSTEM GENERAL CONTROLS

AT

JOHNSTON COMMUNITY COLLEGE

SMITHFIELD, NORTH CAROLINA

JUNE 2004

OFFICE OF THE STATE AUDITOR

RALPH CAMPBELL, JR.

STATE AUDITOR

AUDIT OF THE INFORMATION SYSTEM GENERAL CONTROLS

AT

JOHNSTON COMMUNITY COLLEGE

SMITHFIELD, 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 Johnston Community College
Dr. Donald L. Reichard, President

Ladies and Gentlemen:

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

We wish to express our appreciation to the staff at Johnston 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

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 Johnston 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 Johnston 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 Johnston 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. Johnston 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. Johnston Community College has a Disaster Recovery Plan, however, the plan is incomplete. *See Audit Finding 2, 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 Johnston 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 Johnston 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.

[This Page Left Blank Intentionally]

BACKGROUND INFORMATION

Johnston Community College, located in Smithfield, North Carolina, was founded in 1969. It received its first accreditation from the Southern Association of Colleges and Schools on December 13, 1977 to award degrees, diplomas, and certificates. The College offers the Associate in Applied Science, Associate in Arts, Associate in Fine Arts, and Associate in Science degrees. A diploma is awarded for completion of a one-year Applied Technology program. The College awards certificates for completion of other courses of study. As a member of the North Carolina Community College System, it is a public, two-year post-secondary college with an open-door admission policy. Johnston Community College provides comprehensive occupational, general, and continuing education programs, as well as community service activities for Johnston County and surrounding areas. The College opens its doors to the community and seeks to provide for the fullest possible development of the potential of all students in order that they may increase their knowledge and understanding of life; that they may develop occupational and educational proficiencies in accordance with their interests, talents, and aspirations; and that they may continue their personal growth. To that end, the College, in its programs, services and future plans, strives to reflect the unique demographic, economic and culturally diverse area it serves.

The Division of Information Technology at Johnston Community College is headed by the Dean of Information Technology, who reports to the President of the College. The Division of Information Technology is charged with supporting student learning, faculty teaching, and College operations through the use of information technology. The division attempts to execute its charge by assisting in the accomplishment of the institutional goals. As part of this attempt to assist the institution in achieving its goals, the Division of Information Technology concentrates its efforts in two areas: continuing to upgrade and improve Johnston Community College infrastructure, and continuing to explore new ways to deliver services to students.

[This Page Left Blank Intentionally]

AUDIT RESULTS AND AUDITEE RESPONSES

The following audit results reflect the areas where Johnston 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 Johnston Community College's 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:

- Johnston CC has no written standards or policies and procedures regarding super user access, the monitoring of critical operating systems and servers, and how to respond to security threats. Without adding these critical components to a security program, management has not appropriately communicated to the Johnston CC staff its overall approach to security and internal control in these aforementioned critical areas.
- NCCCS has not provided Johnston CC with a baseline configuration for securing the critical operating system. The critical operating systems may not be secure from commonly known vulnerabilities.
- Johnston 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 Johnston 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 Johnston 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. In addition, 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 Johnston's security policies.

Auditee's Response: We concur with the findings and are working with NCCCS to resolve the noted issues.

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 Johnston 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)*.

AUDIT RESULTS AND AUDITEE RESPONSES (CONCLUDED)

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. Johnston 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. Our audit identified one significant weakness in disaster recovery.

AUDIT FINDING 2: RESUMPTION OF COMPUTER SYSTEMS

Johnston 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:

- Alternate user department procedures to manage their workloads until processing resumes.
- A procedure to update the plan when there are major changes to the environment or at least annually.

In the event of a disaster, the aforementioned components are necessary to ensure the proper recovery of the computer resources. In addition, 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 operations occur.

Recommendation: Johnston 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: We concur with the findings and are working to resolve the noted issues.

[This Page Left Blank Intentionally]

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	Governor of North Carolina
The Honorable Beverly M. Perdue	Lieutenant Governor of North Carolina
The Honorable Richard H. Moore	State Treasurer
The Honorable Roy A. Cooper, III	Attorney General
Mr. David T. McCoy	State Budget Officer
Mr. Robert L. Powell	State Controller
Mr. Martin Lancaster	President
	The North Carolina Community College System
Dr. Donald L. Reichard	President, Johnston Community College

LEGISLATIVE BRANCH

Appointees to the Joint Legislative Commission on Governmental Operations

President Pro Tempore	Speaker of the House
Senator Marc Basnight, Co-Chair	Representative James B. Black, Co-Chair
Senator Charles W. Albertson	Representative Richard T. Morgan, Co-Chair
Senator Patrick J. Ballantine	Representative Martha B. Alexander
Senator Daniel G. Clodfelter	Representative Rex L. Baker
Senator Walter H. Dalton	Representative Bobby H. Barbee, Sr.
Senator Charlie S. Dannelly	Representative Harold J. Brubaker
Senator James Forrester	Representative Debbie A. Clary
Senator Linda Garrou	Representative E. Nelson Cole
Senator Wilbur P. Gulley	Representative James W. Crawford, Jr.
Senator Fletcher L. Hartsell, Jr.	Representative William T. Culpepper, III
Senator David W. Hoyle	Representative W. Pete Cunningham
Senator Ellie Kinnaird	Representative W. Robert Grady
Senator Jeanne H. Lucas	Representative Joe Hackney
Senator Stephen M. Metcalf	Representative Julia C. Howard
Senator Anthony E. Rand	Representative Joe L. Kiser
Senator Eric M. Reeves	Representative Edd Nye
Senator Robert A. Rucho	Representative William C. Owens, Jr.
Senator R. C. Soles, Jr.	Representative Wilma M. Sherrill
Senator Scott Thomas	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