



STATE OF NORTH CAROLINA

AUDIT OF THE INFORMATION SYSTEM GENERAL CONTROLS

AT

**WESTERN CAROLINA UNIVERSITY
CULLOWHEE, NORTH CAROLINA**

FEBRUARY 2003

OFFICE OF THE STATE AUDITOR

RALPH CAMPBELL, JR.

STATE AUDITOR

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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
Board of Trustees, Western Carolina University
Dr. John Bardo, Chancellor

Ladies and Gentlemen:

We have completed our information systems (IS) audit of Western Carolina University. 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 Western Carolina University. The scope of our IS general controls audit included general security, access controls, program maintenance, systems software, systems development, physical security, operations procedures, and disaster recovery. Other IS general control topics were reviewed as considered necessary.

This report contains an executive summary that highlights the areas where Western Carolina University has performed satisfactorily and where improvements should be made.

We wish to express our appreciation to the staff at Western Carolina University 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.'.

Ralph Campbell, Jr.
State Auditor

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EXECUTIVE SUMMARY

We conducted an information system (IS) audit at Western Carolina University from November 18, 2002 through December 10, 2002. 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 did not identify any significant weaknesses in general security controls of information resources.

The **access control** environment consists of access control software and information security policies and procedures. We reviewed the access controls for Western Carolina University's mainframe. We found several 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).

Program maintenance primarily involves enhancements or changes needed to existing systems. We did not identify any significant weaknesses in program maintenance during our audit.

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.

Systems Development includes the creation of new application systems or significant changes to existing systems. We did not identify any significant weaknesses in systems development during our audit.

Physical security primarily involves the inspection of the university'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 not note any significant weaknesses in physical security during our audit.

The **operations procedures** of the computer center include all of the activities associated with running application systems for users. We did not identify any significant weaknesses in operations procedures during our audit.

A complete **disaster recovery** plan that is tested periodically is necessary to enable the University to recover from an extended business interruption due to the destruction of the computer center or other University assets. We did not identify any significant weaknesses in disaster recovery during our audit.

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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 Western Carolina University.

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, systems development, physical security, operations procedures, and disaster recovery which directly affect Western Carolina University'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 application 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

Western Carolina University, located in Cullowhee, North Carolina, was founded in 1889. Western Carolina University is a coeducational residential public university within the University of North Carolina system. The University has a current enrollment of approximately 7,000 students and offers more than 120 majors and concentrations for undergraduates and over 30 graduate level programs of study.

The Computer Center is now part of the Office of the Chief Information Officer (CIO). The department staff support all aspects of Western's information technology (IT) resources - networks, programming, hardware and software, computer labs and classrooms, training, and business systems. A new IT division is planned for the campus and IT resources and services will be consolidated, providing better service to the Western community.

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AUDIT RESULTS AND AUDITEE RESPONSES

The following audit results reflect the areas where Western Carolina University 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. Western Carolina University has established a reasonable security program that addresses the general security of information resources. We did not identify any significant weaknesses in general security during our audit.

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 the Western Carolina University mainframe. We found several significant weaknesses in access controls. Due to the sensitive nature of the conditions found in the control 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).

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. We did not identify any significant weaknesses in program maintenance during our audit.

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. Our audit did not identify any significant weaknesses in system software.

AUDIT RESULTS AND AUDITEE RESPONSES (CONCLUDED)

SYSTEMS DEVELOPMENT

Systems development includes the creation of new application systems or significant changes to existing systems. Systems development projects can be expensive and affect the operations of the agency in significant ways. Consequently, the agency should have a strategic or master plan for systems development. Each development project should be managed using project management techniques and should adhere to a clearly defined systems development methodology. When a project is completed, the finished product should include a comprehensive set of documentation so that the users, operators and programmers each have the information they need to do their jobs. Our audit did not identify any significant weaknesses in systems development.

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. We did not identify any significant weaknesses in physical security during our audit.

OPERATIONS PROCEDURES

The operations of the computer center include all of the activities associated with running application systems for users. Procedures should be in place to control the scheduling and running of production jobs, restarting production jobs when problems occur, storing, handling and mounting of tapes, and maintaining computer equipment. We did not identify any significant weaknesses in the operations procedures of the computer center during our audit.

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 Western Carolina University 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. We did not identify any significant weaknesses in disaster recovery during our audit.

DISTRIBUTION OF AUDIT REPORT

In accordance with G.S. § 147-64.5 and G.S. § 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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N.C. House Speaker Pro-Tem
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Other Officials

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