Audit Committee August 2014

5. Update from the Office of Internal Audit at UNC-GALynne Sanders

Jeff Henderson

Situation: Internal audit work has been completed for UNC General Administration.

Background: The Audit Committee of the Board of Governors serves as the primary audit

committee for the Internal Audit function at UNC General Administration. As per the Audit Committee Charter, in this capacity, the Committee will review internal audit reports and letters issued by the Internal Auditor at UNC-GA.

Assessment: Four Internal Audit projects have been completed by the Interim Internal

Auditors at UNC-GA. The reports for these projects are attached.

Action: This item is for information only



Constituent Universities Appalachian State University

East Carolina University

Elizabeth City State University

Fayetteville State University

North Carolina Agricultural and Technical State University

North Carolina Central University

North Carolina State University at Raleigh

University of North Carolina at Asheville

University of North Carolina at Chapel Hill

University of North Carolina at Charlotte

University of North Carolina at Greensboro

University of North Carolina at Pembroke

University of North Carolina at Wilmington

University of North Carolina School of the Arts

Western Carolina University

Winston-Salem State University

Constituent High School North Carolina School of Science and Mathematics

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GENERAL ADMINISTRATION

POST OFFICE BOX 2688, CHAPEL HILL, NC 27515-2688

Eddie Capel - Interim Internal Auditor

Telephone: (919) 843-4111 • Fax: (919) 843-5180 • E-mail: eacapel@northcarolina.edu

July 9, 2014

President Thomas Ross UNC General Administration 910 Raleigh Rd. P.O. Box 2688 Chapel Hill, NC 27514

Re: Internal Audit-Follow-Up Review of UNC TV Purchase Card Audit

Dear President Ross,

I have conducted a follow-up review of the June, 20, 2013 internal audit of the *UNC TV Purchase Card Usage*. This follow-up review was part of the 2013-14 fiscal year audit plan. There was only one finding in the report and it related to UNC TV's not complying with UNC General Administration's food purchasing policy with the P-Card. UNC TV disagreed with the original finding since the total food purchased that was referred to in the report, amounted to less than \$300.00. However, UNC TV agreed to conduct additional employee training regarding the use of the P-Card and continue to monitor P-Card food purchases for compliance with the policy. The objective of my review was to determine if UNC TV had complied with the internal audit report recommendation.

I selected a sample of P-Card food purchase transactions, subsequent to the audit report release, for compliance with the UNC General Administration policy. I obtained information verifying UNC TV management has reinforced, with the appropriate personnel, the existing food purchasing policy.

Based on my review, I detected no additional exceptions of the UNC General Administration P-Card food purchase policy. UNC TV management did comply with the report recommendation.

Once the new management system implementation, beginning the fall of 2014, is complete it would be appropriate for UNC TV to review the existing P-Card User's Manual and determine if revisions are needed.

I want to express my appreciation for the cooperation and courtesies extended to me during my review by UNC TV and UNC General Administration employees.

Sincerely,

Eddie Capel

Interim Internal Auditor

CC:

Dr. Fred Eshelman, UNC-GA Board of Governors

Mr. Kevin FitzGerald, Chief of Staff

Mr. Charles Perusse, Vice President for Finance

Ms. Marsha D. Fields, Associate Vice President for Finance and Services Officer

Ms. Gail Zimmerman, Director and General Manager (interim), UNC TV

Ms. Kathy Crooke, UNC Television Director of Admin & Business Ventures

North Carolina Office of Internal Audit, Office of State Budget and Management



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July 9, 2014

President Thomas Ross UNC General Administration 910 Raleigh Rd. P.O. Box 2688 Chapel Hill, NC 27514

Re: Internal Audit-Follow-up Review--FRS/HR Access Control audit

Dear President Ross,

I have conducted a follow-up review of the July 13, 2011 internal audit of the *UNC GA Financial Records and Human Resources System User Access Controls*. This follow-up review was scheduled as part of the 2013-14 fiscal year audit plan. The objectives of the follow-up were to verify management's compliance with the report recommendations. In the report, recommendations were made for the Business Office and Human Resources to strengthen controls over granting system access.

I conducted interviews of Business Office and Human Resources personnel responsible for complying with the report recommendations as needed. I reviewed various security access reports and other documents as I deemed necessary.

Based on my review, it is my opinion that the UNC General Administration Business Office and Human Resources Office did comply with the internal audit report recommendations.

Once the new management system implementation, beginning in the fall of 2014 is completed, UNC General Administration Business Office and Human Resources should review access controls and determine if changes are needed.

I want to express my appreciation for the cooperation and courtesies extended to me during my follow-up review by UNC General Administration employees.

Sincerely,

Eddie Capel Interim Internal Auditor CC:

Dr. Fred Eshelman, UNC-GA Board of Governors

Mr. Kevin FitzGerald, Chief of Staff

Mr. Charles Perusse, Chief Operating Officer

Mr. William Fleming, Vice President for Human Resources

Mr. Kenneth Craig, Associate Vice President for Compliance & Operational Efficiency

Ms. Marsha D. Fields, Associate Vice President for Finance and Services Officer

Ms. Gayle Davis, Director of Human Resources

North Carolina Office of Internal Audit, Office of State Budget and Management



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July 9, 2014

President Thomas Ross UNC General Administration 910 Raleigh Rd. P.O. Box 2688 Chapel Hill, NC 27514

Re: Internal Audit-Follow-up Review-President, Vice Presidents & Chief of Staff Expenses

Dear President Ross,

I have completed a follow-up review of the June 26, 2012 internal audit of the *President, Vice Presidents Chief of Staff Expenses*. This follow-up review was scheduled as a part of the 2013-2014 fiscal year audit plan. The objective of my review was to determine if UNC General Administration had complied with the internal audit report recommendation. The recommendation related to improving documentation and the approval process for expenses of these offices. Management agreed with the recommendation and stated that actions would be taken to improve the processes.

Subsequent to the internal audit report, UNC General Administration personnel conducted training sessions for the business office operations, including accounting services, purchasing, travel, contract and grants and offered the training to all employees. Detailed handouts explaining the policies and procedures of UNC General Administration were provided to as part of the training.

Based on my review, it is my opinion that UNC General Administration management did comply with the audit report recommendation.

Once the new management system implementation, beginning the fall of 2014, is complete it would be appropriate for UNC General Administration to review the existing policies and procedures to determine if revisions are needed.

I want to express my appreciation for the cooperation and courtesies extended to me during my review by UNC General Administration employees

Sincerely,

Eddie Capel Interim Internal Auditor CC:

Dr. Fred Eshelman, UNC-GA Board of Governors

Mr. Kevin FitzGerald, Chief of Staff

Mr. Charles Perusse, Chief Operating Officer

Ms. Marsha D. Fields, Associate Vice President for Finance and Services Officer North Carolina Office of Internal Audit, Office of State Budget and Management



Office of Internal Audit

June 2, 2014

Ms. Lynne Sanders
University of North Carolina, General Administration
Assistant Vice President for Audit and Financial Reporting
Post Office Box 2688
Chapel Hill, NC 27515-2688

The Office of Internal Audit conducted a follow-up review of the State Auditor's report titled "UNC-General Administration, Banner Hosting Services," dated December 19, 2013. We evaluated the University's response and verified corrective actions to strengthen controls or ensure compliance. In our opinion, the University has responded to each finding and has put corrective measures in place. The Office of State Auditor (OSA) original findings and recommendations, UNC-GA management's response, and our current conclusions are included below.

AUDIT FINDINGS, RECOMMENDATIONS AND RESPONSES

The results of our audit disclosed deficiencies considered reportable under *Government Auditing Standards*. Findings regarding network security, due to their sensitive nature, are reported to UNC-GA management by separate letter and should be kept confidential as provided in North Carolina G.S. 132-6.1(c).

The auditors found deficiencies related to information technology (IT) governance practices by UNC-GA that could increase the risk of inadequate performance by Banner Hosting Services' employees and contractors. Specifically, auditors found:

FINDING #1: KEY DATA SECURITY AND SYSTEM AVAILABILITY STANDARDS ARE NOT DEFINED AND INCLUDED IN WRITTEN AGREEMENTS

Security Standards for Information Systems are guided by three main principles:

Availability: Allows authorized users to depend on systems to access needed data in a timely manner, even after a system failure or occurrence of a natural disaster.

Integrity: Allows authorized users to trust that data is both unaltered and accurate.

Confidentiality: The prevention of unauthorized information disclosure using appropriate security safeguards.

Service level agreements (SLA's) between Banner Hosted Services and the six universities receiving services do not define and include key standards involving data security and availability of the Banner

system. The lack of standards and failure to monitor compliance against those standards elevates the risk of incidents that could adversely affect the confidentiality, integrity, and availability of hosted data, affecting the ability of campuses to rely on the Banner system. The Banner system processes financial data for campuses, which may include payroll, student tuition and fees, student financial aid, accounts payable, and cash accounts.

Existing SLA's Do Not Adequately Address Key Areas:

- Disaster Recovery—Key metrics involving availability are not formally defined. Without clearly defined expectations, there is a risk of data loss and unexpected downtime from disasters affecting primary data centers. For example, SLAs lack provisions to help UNC-GA facilitate disaster recovery testing with campuses. In addition, agreements fail to specify recovery time objectives and recovery point objectives. A recovery time objective is the amount of time needed to restore systems after a disaster occurs. A recovery point objective is the amount of data lost after a disaster, measured by how far back in time the system is restored.
- Security Monitoring, Incident Response, and Reporting—SLA's did not define levels of security monitoring of hosted services or describe appropriate incident response procedures, including how campuses are notified of such incidents. Without monitoring and reporting of incidents, UNC-GA and campuses receiving hosted services may not be able to appropriately respond to incidents affecting the confidentiality, integrity, or availability of hosted data. Not only does this increase the risk of non-compliance with state and federal requirements, it increases the difficulty of UNC-GA preventing similar incidents from recurring in the future.
- Dispute Resolution—SLA's lacked details on how campuses can resolve disputes involving hosted services, including problems that may arise from data loss and system availability.

Missing or Ineffective Service Level Agreements (SLA's):

- Western Data Center—UNC-GA lacked a signed SLA with the North Carolina Office of Information Technology Services (ITS) for its use of the Western Data Center to support Hosted Banner Services. Without an enforceable agreement, UNC-GA accepts undue risks in relying upon the Western Data Center to support availability of Banner Hosted Services.
- Elizabeth City State University (ECSU)—although UNC-GA has an SLA defined with ECSU, UNC-GA failed to review the agreement for effectiveness. Throughout the document, the ECSU campus is referred to as "East Carolina State University" instead of Elizabeth City State University.

Recommendations

- Update existing service level agreements with campuses with specific provisions that current agreements do not adequately address, including:
 - O Disaster recovery continue disaster recovery testing with hosted campuses to define reasonable recovery point objectives and recovery time objectives.
 - O Security monitoring define security events to monitor on hosted servers. The definition should clarify the frequency of associated security reports provided to campuses as well as a description of incident response procedures and notification.
 - O Dispute resolution define an agreed to dispute resolution process with hosted campuses to handle disagreements or other incidents, such as data loss.
- Complete a service level agreement for the Western Data Center to ensure that the North Carolina Office of Information Technology Services can adequately support intended availability metrics of Banner Hosting Services.
- Correct the service level agreement for Elizabeth City State University to incorporate the proper legal name of the campus.

UNC-GA Response

Disaster Recovery:

• We agree with the findings and recommendations. The UNC-GA hosting staff is currently completing a draft of a new service level agreement (SLA) that will clearly state the disaster recovery testing schedule, recovery time objectives and recovery point objectives. We expect the draft to be completed no later than January 15, 2014, and then forwarded to the hosted campuses for further review. Upon completion of the review, the new SLA will be sent to the campuses for signature.

Security Monitoring, Incident Response, and Reporting:

• We agree with the findings and recommendations. The UNC-GA hosting staff team is currently completing a draft of a new SLA that will clearly state the expected levels and process for security monitoring of the systems within the hosted environment. The draft will also include the expected incident response procedure and campus notification process. We expect the draft to be completed no later than January 15, 2014, and then forwarded to the hosted campuses for further review. Upon completion of the review, the new SLA will be sent to the campuses for signature.

Dispute Resolution:

We agree with the findings and recommendations. The UNC-GA hosting staff is currently
completing a draft of a new SLA that will clearly state the dispute resolution procedure. We
expect the draft to be completed no later than January 15, 2014, and then forwarded to the hosted
campuses for further review. Upon completion of the review, the new SLA will be sent to the
campuses for signature.

Missing or Ineffective Service Level Agreements:

- Western Data Center: We agree with the finding and recommendation. The finding has been corrected; a Memorandum of Understanding has been signed with the Western Data Center.
- Elizabeth City State University: We agree with the finding and recommendations. The finding
 has been corrected; the current SLA executed with Elizabeth City State University has been
 updated.

Internal Audit's Conclusion: The UNC GA staff has updated the Service Level Agreement template to include the hosting team's responsibilities for disaster recovery, security monitoring, incident response and reporting, and dispute resolution. The template is still in draft form with the intention of being approved and signed by a representative of each hosted campus in July 2014. Internal Audit plans to review the signed documents to ensure they contain the above inclusions. A memorandum of understanding has been executed with the Western Data Center, and the service level agreement with Elizabeth City State University has been updated. It is Internal Audit's opinion that satisfactory progress has been made toward resolving this finding.

FINDING #2: LONG-TERM PRESERVATION OF FINANCIAL DATA NOT MADE

Backups of data from information systems can be produced in a variety of ways depending on the intended purpose of the backup. Data backups fall into one of two categories:

- Active backups—copies of data that are readily accessible to restore systems in the event the primary system goes offline. Often, these backups are maintained for a short period and are overwritten by a more current backup on a regular basis.
- Archival backups—copy of data representing a point-in-time snapshot stored in a secured,

offline location for many years. Archives are often used to address regulations governing the long-term preservation of data, but they can also play an integral part in restoring systems to a specific point-in-time.

The current backup configuration is not designed to address long-term archival needs. Given the inherent limitations of capacity of online backup systems, the active backups maintained online by UNC-GA Hosting Services are overwritten multiple times within each accounting cycle. Therefore, the current backup configuration is not designed to address long-term archival needs. If data were to become corrupted and go unnoticed until after all active backups are overwritten, the current system provides no means to restore systems to a point-in-time prior to the corruption event.

UNC-GA Hosting Services currently maintains multiple copies of data in an online system to address the need to have active backups supporting system restoration. These backups are stored both locally at the primary site and are replicated to the backup site, allowing for system to switch processing to the backup site in the event the primary sites goes offline.

This system does not adequately address policies or regulations requiring campuses to preserve point-intime snapshots of data for multiple years. To comply with federal and state regulations for data, UNC campuses are required to maintain long-term archives of data for multiple years.

UNC-GA has not communicated with campuses to determine each campus' specific archival needs. Because each campus may house different types of data in the Banner Hosting Environment, each campus has unique data archive requirements. Without defining these needs, UNC-GA is not able to devise plans or assign responsibilities designed to assist campuses with regulatory compliance requirements pertaining to data archives.

Recommendations

Communicate with each hosted campus to determine its long-term data retention requirements. Document an agreement with each campus that defines:

- The frequency in which data archives need to be created and storage media to be used.
- The security requirements of the archives, including physical security, use of encryption, and management of any encryption keys used.
- The party responsible for physically maintaining offline data archives. This responsible party can be a representative from UNC-GA, a representative from the hosted campus, or a representative from a third-party vendor. Regardless of the responsible party, archives should be stored in a secured location that is geographically separate from the data centers used by UNC-GA.

UNC-GA Response

- We agree with the findings and recommendations. The UNC-GA hosting staff is currently completing a draft of a new SLA that will clearly state the campus's responsibility for the long-term archiving and offsite storage of campus financial data. We expect the draft to be completed no later than January 15, 2014, and then forwarded to the hosted campuses for further review. Upon completion of the review, the new SLA will be sent to the campuses for signature.
- The UNC-GA hosting staff will conduct a survey and review process to identity campus processes, options, expectations and retention requirements in this area. This survey will be completed by January 31, 2014, and if it is determined this service needs to be offered within the hosted environment, the UNC-GA hosting staff will develop a solution with an appropriate business model, and submit the proposal to the campuses for review. The solution will clearly

state the performance goals related to frequency of archiving, the identification of any security measures required for the archived data, and the identification of responsible parties for the maintenance of off-site storage. Upon campus approval, the proposed solution will be implemented. A description of the service, along with its performance metrics and responsibilities, will be clearly stated as an addendum to the existing SLA, or, depending on the adopted business model, a separate SLA covering the archival storage of data will be developed.

Internal Audit's Conclusion: The UNC GA staff has updated the Service Level Agreement template to include long-term data archiving as a campus responsibility. The template is still in draft form with the intention of being approved and signed by a representative of each hosted campus in July. Internal Audit plans to review the signed documents to ensure they contain the above inclusion. It is Internal Audit's opinion that satisfactory progress has been made toward resolving this finding.

FINDING #3: NO FORMAL TRAINING PROCESS AND CONFIDENTIALITY AGREEMENT

UNC-GA does not provide formal technical or security awareness training to employees working with Banner Hosting Services. These same employees also do not receive information regarding the confidentiality of data stored within the hosted environment nor are they required to sign a confidentiality agreement covering information they may see in their normal course of duties. Without formal training and agreement by employees, employees supporting Banner Hosting Services may make decisions that compromise the security of hosted data.

Formal Training and Security Awareness

Employees supporting Banner Hosting Services need to remain aware of the risks associated with a rapidly changing IT landscape. New threats to data security evolve each day and employees supporting Banner Hosting Services must be aware of these threats in order to guard against them. Without formal training conducted on a regular basis, employees may be unaware of risks and inadvertently make decisions that compromise security, causing hosted services to become vulnerable to exploitation and data loss.

Confidentiality Agreements

In providing Banner Hosted Services to campuses within the UNC System, UNC-GA and its support personnel accept responsibility for being custodians of campus data. This responsibility requires UNC-GA management to ensure that sufficient administrative controls are in place to safeguard the integrity and confidentiality of hosted data.

An important administrative control involves training employees about confidentiality rules related to the data under their care. Such training should conclude by gathering explicit acceptance of these rules. Without formal employee training and subsequent receipt of understanding and acceptance of rules regarding confidentiality, staff members may not understand the data they work with is confidential. This increases the risk that employees may inadvertently share it with other parties, possibly in violation of laws and regulations.

Recommendations

Develop a formal security awareness program for staff supporting Banner Hosting Services. The
program should include both general security training as well as risks specific to the hosted
environment, as identified in the internal risk assessment. Training to communicate these updates
to staff should occur annually or after major changes to the hosted environment.

• Provide annual training to staff on state and federal regulations for data that resides on the hosted servers. At the conclusion of such training, staff should agree to and sign a confidentiality agreement covering student and financial data housed within the hosted environment.

UNC-GA Response

Formal Training and Security Awareness:

• We agree with the findings and recommendations. The UNC-GA Division of Information Technology is currently developing a UNC-GA program to cover general annual security awareness and sensitive data handling, and this program will include the personnel who support and use data from the hosted environment. We have procured training videos from the SANS "Securing the Human" program, as well as the "application developer" modules, and will deploy these videos as part of our training program. We will work with UNC-GA Division of Human Resources to develop our enterprise plan, and if the rollout of the general plan is delayed beyond March 15, 2014, we will roll out a targeted effort to the technical staff within the hosted environment prior to that date. We will supplement the formal effort with occasional web ex presentations (or similar) from experts and vendors who operate in the data security awareness and policy space (FBI cyber security program, etc.).

Confidentiality Agreements:

We agree with the findings and recommendations. As part of the general security awareness
training outlined above, the UNC-GA Division of Information Technology will develop a
blanket confidentiality agreement for the employees at UNC-GA, and if the rollout of the general
confidentiality agreement is going to be delayed beyond March 15, 2014, we will roll out a
specific confidentiality agreement to the technical staff within the hosted environment prior to
that date.

Internal Audit's Conclusion: The UNC GA Division of Information Technology has developed a program to cover general annual security awareness and sensitive data handling, and this program includes the personnel who support and use data from the hosted environment. The program is SANS Human Training and is up and running. The Division has also developed an Employee Confidentiality Agreement that will be required for all staff involved with the hosted environment. It is Internal Audit's opinion that satisfactory progress has been made toward resolving this finding.

FINDING #4: FEEDBACK FROM CAMPUSES NEEDED TO ASSESS PERFORMANCE AND MINIMIZE RISKS

UNC-GA did not seek feedback from campuses on Banner Hosted Services and did not include hosted services in its most recent information technology (IT) risk assessment. Consequently, the opportunities to identify and improve hosted services were not maximized. In providing Banner Hosting Services to campuses within the UNC System, UNC-GA assumes the responsibility of maintaining an active dialog with each hosted campus to determine what each campus defines as acceptable performance related to availability, integrity, and confidentiality of hosted data.

Policy Review and Campus Feedback

Although UNC-GA has a well-established system for tracking feedback on specific support issues, written feedback was not collected from campuses related to the overall performance of hosting services. Without this written feedback, UNC-GA cannot perform an effective review of data security and system availability of its systems. This is significant because UNC-GA intends to promote these services to more UNC campuses.

Risk Assessment

UNC-GA performs an annual IT risk assessment, but the most recent assessment, dated in 2011, contained a significant gap because it did not consider Banner Hosted Services in its analysis. Without knowledge of specific risks associated with hosted services, campuses are not able to provide UNC-GA with feedback about additional areas related to integrity and confidentiality that should be more closely monitored.

Recommendations

The agreed upon metrics that drive the governance of Banner Hosted Services should be clearly defined in the Service Level Agreements between UNC-GA and each campus. To meet these goals effectively, UNC-GA should regularly review the performance of Banner Hosted Services against these metrics and actively communicate with the campuses areas of risk that could affect the performance of Banner Hosted Services:

- Implement a formal method to gather feedback from campuses on the performance of hosting services and risks they have identified in their own risk assessments. Incorporate this feedback in a periodic review process covering service level agreements, with the objective of ensuring written agreements are effective and adequately address risks related to availability, integrity, and confidentiality of UNC-GA Hosted Services.
- Perform an annual risk assessment that includes Banner Hosting Services and share information related to Banner Hosting Services with affected campuses. In cooperation with affected campuses, devise and implement plans to address risks on an agreed-upon timetable.

UNC-GA Response

Policy Review and Campus Feedback:

• We agree with the findings and recommendations. The UNC-GA hosting staff will develop a formal mechanism to receive written campus feedback on an annual basis, and have this mechanism in place prior to March 1, 2014. For campuses subscribed to the hosted environment, we have implemented a new two-tiered governance structure that will help facilitate this process and provide multiple entry points to receive campus feedback. In the meantime, the campus representatives meet on a regular basis (at least quarterly) via in-person meetings or videoconferences. During those meetings, we provide the opportunity for the campus representatives to raise issues of concern and provide feedback. Additionally, UNC-GA hosting staff is also in constant contact — via email, text and phone — with campus representatives.

Risk Assessment:

• We agree with the findings and recommendations. The finding has been corrected and a new version of the UNC-GA Risk Assessment has been posted to the UNC-GA website. The updated version includes risk discussion for the hosted environment.

Internal Audit's Conclusion: The UNC GA staff has updated the Service Level Agreement template to clarify the overall governance of the Hosted services environment and to review the established metrics with performance. The template also states that an annual risk assessment will be performed and that the assessment will include the Banner Hosted Services. The template is still in draft form with the intention of being approved and signed by each hosted campus in July 2014. The UNC GA staff has also developed a formal document that will be used to obtain feedback from the hosted campus about performance. This document will be sent out annually starting in July 2014. Internal Audit plans to review both the signed documents to ensure they contain the above inclusion and the feedback from the

hosted campuses once those have been submitted. The risk assessment was updated to include the Banner Hosted Services. It is Internal Audits opinion that satisfactory progress has been made toward resolving this finding.

Should you have any questions, please feel to contact me at (919) 962-4656 or jahenderson@northcarolina.edu.

Sincerely,

Jeffrey A. Henderson, CPA, CISA

Interim Internal Auditor

cc: Ms. Beth A. Wood, State Auditor

Mr. Thomas Ross, President, University of North Carolina, General Administration

Mr. Charlie Perusse, Chief Operating Officer

Mr. John Leydon, Chief Information Officer

Mr. Michael Burch, Information Systems Audit Manager, Office of the State Auditor

Mr. Ben McLawhorn, Office of the State Controller

The Office of Internal Audit, Office of State Budget and Management