Audit Report

University System of Maryland
Frostburg State University

August 2013

OFFICE OF LEGISLATIVE AUDITS
DEPARTMENT OF LEGISLATIVE SERVICES
MARYLAND GENERAL ASSEMBLY

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DEPARTMENT OF LEGISLATIVE SERVICES
OFFICE OF LEGISLATIVE AUDITS
MARYLAND GENERAL ASSEMBLY

Karl S. Aro
Executive Director

Thomas J. Barnickel III, CPA
Legislative Auditor

August 21, 2013

Senator James C. Rosapepe, Co-Chair, Joint Audit Committee
Delegate Guy J. Guzzone, Co-Chair, Joint Audit Committee
Members of Joint Audit Committee
Annapolis, Maryland

Ladies and Gentlemen:

We have audited the University System of Maryland (USM) – Frostburg State University (FSU) for the period beginning June 1, 2009 and ending June 3, 2012. FSU is a comprehensive public institution of the University System of Maryland and provides a broad range of baccalaureate programs as well as selected master's programs.

Our audit disclosed that FSU did not document the rationale for its decision regarding the selection of the site for its newly constructed Sustainable Energy Research Facility (SERF). The selection of the site was critical because existing contractual arrangements for the location required the use of a certain developer, who then used an affiliated contractor to perform the construction work. FSU did not request the developer to obtain bids from other construction contractors and did not obtain required approvals for the contract and the project from the Board of Public Works and USM. The SERF is intended to serve as the center for renewable energy research by FSU faculty and students and to demonstrate technologies that allow buildings to be energy self-sufficient. As of July 2013, FSU paid the developer approximately $2 million for design and construction of the SERF.

We also noted internal control and record keeping deficiencies over FSU's information systems and network. For example, FSU did not log critical security and audit events for critical databases and did not provide a comprehensive intrusion detection prevention system for FSU's computer network.

301 West Preston Street · Room 1202 · Baltimore, Maryland 21201
410-946-5900/301-970-5900 · Fax 410-946-5999/301-970-5999
Toll Free in Maryland 877-486-9964 · Fraud Hotline 877-FRAUD-11

The USM Office's response to this audit, on behalf of FSU, is included as an appendix to this report. We wish to acknowledge the cooperation extended to us during the course of this audit by FSU.

Respectfully submitted,

Thomas J. Barnickel III, CPA
Legislative Auditor

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* **Denotes item repeated in full or part from preceding audit report**

Background Information

Agency Responsibilities

Frostburg State University (FSU) is a comprehensive public institution of the University System of Maryland (USM) and operates under the jurisdiction of the System's Board of Regents. FSU offers an array of baccalaureate and master's degrees with an emphasis on arts, humanities, business, applied technologies, education, environmental sciences, human services, and social and behavioral sciences. Student enrollment for the Spring 2012 semester totaled 5,063 students, including 4,361 undergraduate students and 702 graduate students. FSU's budget is funded by unrestricted revenues, such as tuition and fees and a State general fund appropriation, and by restricted revenues, such as federal grants and contracts. According to the State's accounting records, FSU's revenues for fiscal year 2012 totaled approximately $103.3 million, including a State general fund appropriation of approximately $33.5 million.

Status of Findings From Preceding Audit Report

Our audit included a review to determine the status of the eight findings contained in our previous audit report dated February 4, 2010. We determined that FSU satisfactorily addressed seven of these findings. The remaining finding is repeated in this report.

Findings and Recommendations

Sustainable Energy Research Facility (SERF)

Background

In September 2008, Frostburg State University (FSU) received a federal grant from the U.S. Department of Energy (DOE) totaling $738,000, which required State matching funds of $738,000 ($1,476,000 in total), for the design and construction of a Sustainable Energy Research Facility (SERF). The grant budget included $710,000 in construction funds and the balance was for associated personnel, equipment, and indirect costs. The SERF was originally intended to be a residential type building or exhibition house of approximately 4,000 square feet to serve as an example of a self-sufficient, off-grid building for individuals seeking energy security in Western Maryland or similar geographic locations. Ultimately, the scope of the SERF project was revised and the size of the building increased, resulting in a 6,300 square foot research facility and increasing the design and construction costs to approximately $2 million, with the additional costs being funded with FSU unrestricted funds. (These design and construction costs excluded the costs of certain integrated specialty equipment to support the sustainable energy aspect of the building.) The SERF is located on land designated as the Allegany Business Center on FSU property. The building is powered and heated with all renewable energy resources including solar, wind, and hydrogen fuel technology. This facility is intended to serve as the center for renewable energy research, instruction, and demonstration by FSU faculty, students, and visiting experts.

The Allegany Business Center property has been leased by FSU to Allegany County since January 2001.[1] The County divided the leased property into four sites, and in March 2007, it sub-leased two of the sites (site one and site two) to a developer. The developer was to construct buildings at these two sites at its own cost and rent to tenants.

In July 2010, FSU selected site two on which to build the SERF and awarded the construction contract to the aforementioned developer on September 6, 2011. The building was substantially completed in October 2012.

[1] The property lease was amended and approved by Board of Public Works in April 2008.

Finding 1
FSU did not document the rationale for its selection of the construction site, did not obtain the required control agency approvals, and did not ensure construction costs were reasonable.

Analysis
FSU did not document the rationale for its site selection decision, did not obtain the required control agency approvals, and did not require the developer to competitively bid for the construction of a SERF building contract. Our review disclosed the following conditions:

- FSU did not document the rationale for its decision to select site two at the Allegany Business Center for construction of the SERF and its consideration of other sites, if any. We were advised by FSU management that this site was chosen because it met the space and elevation requirements for the facility's renewable energy technologies and was accessible to the visiting public. As noted below, the selection of site two for the SERF required FSU to use a certain developer to build the facility rather than allow a competitive bid process.

- FSU did not request the developer to obtain additional bids from other contractors to ensure the SERF design and construction costs of $2 million were fair and reasonable. Site two was subleased from Allegany County to a developer with sole rights to construct buildings at this site, and the developer's construction cost estimate was provided by a company which appeared to be affiliated with the developer. The developer and the general contractor shared the same business address, and the owner of the general contracting company signed the contract with FSU as the managing partner of the development company.

- A member of FSU's Board of Visitors, which was an advisory board to FSU's president, was associated with the developer and the general contractor. According to State ethics laws, a board member may not have a financial interest in or be employed by an entity having or negotiating a contract with the agency with which the member is affiliated. This individual served on the Board since at least 2006 and until FSU suspended the Board's activities in October 2012. After consultation with State Ethics Commission staff, we believe this matter warrants a review by the Commission to determine if a conflict of interest occurred in violation of State ethics laws.

- Even though the scope and size of the SERF were expanded, FSU did not obtain approval for the project from the University of Maryland, College Park Service Center. The Center is responsible for procuring and monitoring facility construction services for certain University of Maryland institutions, including FSU, when the related costs are expected to total $1 million or more. In April 2009, FSU discussed its intent to build a SERF with the Service Center. At the time, FSU estimated that the costs would be less than $1 million and the Service Center advised that FSU could pursue the contract in-house. However, at the time of the site selection in July 2010, FSU management changed the scope of the contract, increasing the size and costs of the project above the $1 million threshold. FSU management sought approval from the University System of Maryland (USM) to enter into the design and construction contract but proceeded without a response from USM. As of July 2013, FSU paid approximately $2 million to the developer for this project, consisting of $1.6 million in FSU unrestricted funds and $400,000 in federal funds.

- FSU did not submit the construction contract to the Board of Public Works (BPW) for approval, as required for construction projects exceeding $500,000. Also, FSU did not obtain approval for the construction contract from the Chancellor of USM, as required. According to USM policies, capital improvement projects exceeding $500,000 shall be submitted to BPW for approval and projects costing between $1 million and $5 million require approval of the Chancellor of USM.

Recommendation 1
We recommend that FSU

a. in the future, comply with the aforementioned USM procurement policies, fully document the rationale for decisions related to procurements, and take the necessary steps to ensure it receives the best value;
b. submit the above project to USM and the Board of Public Works for retroactive approval; and
c. refer the aforementioned matter to the State Ethics Commission.

Information Systems Security and Control

Background
FSU's Office of Networking and Telecommunications and Office of Administrative Computing provide technical information systems support to FSU through the operation and maintenance of campus-wide administrative

applications, such as the human resources and student administration system, and the financial system. The Offices also operate an integrated administrative and academic computer network, which provides connections to multiple servers used for administrative applications and related databases. The campus network also includes Internet connectivity, a firewall and other network traffic filtering devices, and an extensive campus wireless network. FSU also maintains a website that functions as an entry point to many of its services.

Finding 2
Password controls and monitoring of critical systems were inadequate.

Analysis
Password controls and monitoring of critical systems were inadequate. Specifically, we noted the following conditions over the human resources and student administration system and the financial system:

- For the aforementioned applications, FSU did not generate reports of changes to permission lists to identify changes in user access to critical menus and objects, so that these changes could be reviewed for propriety. The USM *Guidelines in Response to the State's IT Security Policy* require that institutions maintain appropriate audit trails of events and actions related to critical applications and data.

- FSU did not log critical security and audit events (for example, grant privilege, stop audit) for the human resources and student administration database for review purposes. In addition, although failed logon attempts to this database were logged, we were advised that these logged items were not reviewed. The aforementioned *Guidelines* also require that institutions ensure that all critical systems have the ability to log and report security incidents and attempted violations of system security.

- Password controls over complexity, length, and history for both applications did not comply with the aforementioned USM *Guidelines*. For example, the minimum password length was set to six rather than eight characters.

As a result of these conditions, unauthorized or inappropriate activities affecting the integrity of FSU's critical human resources and student administration system and its financial system could occur and go undetected.

Recommendation 2

We recommend that FSU

a. regularly generate and review reports of changes to permission lists for the aforementioned critical applications,

b. log critical security and audit events for the human resources and student administration database and review all database security reports and retain documentation of these reviews, and

c. implement controls over passwords in accordance with the USM *Guidelines in Response to the State's IT Security Policy*.

Finding 3

Intrusion Detection Prevention System (IDPS) coverage for FSU's network was not comprehensive.

Analysis

IDPS coverage for FSU's network was not comprehensive. Specifically, IDPS coverage did not exist for certain network traffic flowing from untrusted sources, such as student labs, to FSU servers that were located in critical network zones. We noted that, although the network included a network-based IDPS, it was not configured to analyze traffic destined for numerous servers on the internal network including critical student administration and financial application servers. A similar condition was commented upon in our preceding audit report. In addition, FSU did not utilize Host-based Intrusion Protection Systems (HIPS) on critical web servers that processed encrypted traffic. HIPS can read and analyze such traffic and protect critical web servers from malicious traffic, whereas FSU's network-based IDPS cannot read such traffic flowing into its network, creating a network security risk.

Strong network security uses a layered approach, relying on various resources structured according to assessed network security risks. Properly placed and configured IDPS devices, including HIPS, can aid significantly in detecting and responding to potential network security breaches and attacks. Without adequate IDPS coverage, security breaches and attacks can be difficult to detect, allowing for considerable damage before such events become apparent and increasing the costs involved in responding to attacks and remediation of damages.

Recommendation 3

We recommend that FSU provide adequate IDPS protection for its network (repeat). Specifically, we recommend that FSU

a. perform a documented review and assessment of its network security risks from untrusted sources and identify how IDPS and HIPS coverage should be best applied for its network (repeat), and

b. implement appropriate coverage based on this review.

Finding 4
Proper security controls were not established over the virtual server environment.

Analysis
Proper security controls were not established over the virtual server environment. Specialized software developed in recent years allows for a single physical host server's resources (memory, CPU, and storage) to be defined and subdivided into multiple virtual servers that can each operate as a separate unique server. As of September 2012, FSU was using four physical host servers that hosted 89 virtual servers, including servers that supported the critical human resources and student administration system and financial system. Our tests disclosed the following conditions:

- Certain security option settings on the host servers' virtualization software were not properly configured to reject certain malicious activity, such as forged transmissions, in accordance with the software vendor's recommended security settings. As a result, network level security for the virtual servers configured on these hosts was weakened.

- The host servers were running vulnerable virtualization software. Specifically, as of October 12, 2012, these servers were using virtualization software that had not been updated for eight significant software patches released before July 12, 2012. The USM *Guidelines in Response to the State's IT Security Policy* requires that all devices have software updates and patches installed on a timely basis to correct significant security flaws.

- The host servers' logs were not stored on a separate logging server. Use of a remote logging server provides protection from possible modification of logs by a compromised host server. Furthermore, server log messages were not reviewed for security event monitoring purposes. USM *Guidelines in Response to the State's IT Security Policy* require member institutions to maintain appropriate audit trails and implement review procedures.

Recommendation 4
We recommend that FSU

a. configure the host servers' virtualization software in accordance with the vendor's recommendations to help ensure adequate security over the resident virtual servers,

b. apply virtualization software patches in a timely manner to correct significant security-related vulnerabilities, and

c. send host server log messages to a log storage server on a separate server and perform regular reviews of these security logs with such reviews being documented and retained for audit verification purposes.

Audit Scope, Objectives, and Methodology

We have audited the University System of Maryland (USM) – Frostburg State University (FSU) for the period beginning June 1, 2009 and ending June 3, 2012. The audit was conducted in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

As prescribed by the State Government Article, Section 2-1221 of the Annotated Code of Maryland, the objectives of this audit were to examine FSU's financial transactions, records, and internal control, and to evaluate its compliance with applicable State laws, rules, and regulations. We also determined the status of the findings contained in our preceding audit report.

In planning and conducting our audit, we focused on the major financial-related areas of operations based on assessments of materiality and risk. The areas addressed by the audit included purchases and disbursements, student accounts receivable, financial aid, cash receipts, payroll, and information technology systems. Our audit procedures included inquiries of appropriate personnel, inspection of documents and records, and observations of FSU's operations. We also tested transactions and performed other auditing procedures that we considered necessary to achieve our objectives. Data provided in this report for background or informational purposes were deemed reasonable, but were not independently verified.

Our audit did not include certain support services provided to FSU by the USM Office. These support services (for example bond financing) are included within the scope of our audit of the USM Office. In addition, our audit did not include an evaluation of internal controls for federal financial assistance programs and an assessment of FSU's compliance with federal laws and regulations pertaining to those programs because the State of Maryland engages an independent accounting firm to annually audit such programs administered by State agencies, including the components of USM.

FSU's management is responsible for establishing and maintaining effective internal control. Internal control is a process designed to provide reasonable assurance that objectives pertaining to the reliability of financial records, effectiveness, and efficiency of operations including the safeguarding of assets, and compliance with applicable laws, rules, and regulations are achieved.

Because of inherent limitations in internal control, errors or fraud may nevertheless occur and not be detected. Also, projections of any evaluation of internal control to future periods are subject to the risk that conditions may change or compliance with policies and procedures may deteriorate.

Our reports are designed to assist the Maryland General Assembly in exercising its legislative oversight function and to provide constructive recommendations for improving State operations. As a result, our reports generally do not address activities we reviewed that are functioning properly.

This report includes conditions that we consider to be significant deficiencies in the design or operation of internal control that could adversely affect FSU's ability to maintain reliable financial records, operate effectively and efficiently, and/or comply with applicable laws, rules, and regulations. Our report also includes findings regarding significant instances of noncompliance with applicable laws, rules, or regulations. Other less significant findings were communicated to FSU that did not warrant inclusion in this report.

The USM Office's response, on behalf of FSU, to our findings and recommendations, is included as an appendix to this report. As prescribed in the State Government Article, Section 2-1224 of the Annotated Code of Maryland, we will advise the USM Office regarding the results of our review of its response.

APPENDIX

OFFICE OF THE CHANCELLOR

August 16, 2013

Mr. Thomas J. Barnickel III, CPA
Legislative Auditor
Office of Legislative Audits
State Office Building, Room 1202
301 West Preston Street
Baltimore, MD 21201

Re: University System of Maryland –
Frostburg State University
Period of Audit: June 1, 2009 through
June 3, 2012

Dear Mr. Barnickel:

I have enclosed the University System of Maryland's responses to your draft report covering the examination of the accounts and records of Frostburg State University. Our comments refer to the individual items in the report.

Sincerely yours,

William E. Kirwan
Chancellor

WEK:mk
Enclosures

cc:
Dr. Jonathan C. Gibralter, FSU
Mr. James L. Shea, Chair, Board of Regents
Mr. Anwer Hasan, Chairman, MHEC
Dr. Danette Howard, Secretary of Higher Education, MHEC
Mr. Robert Page, Associate Vice Chancellor for Finance, USM Office
Mr. David Mosca, Director of Internal Audit, USM Office

1807 **University of Maryland, Baltimore**
1856 **University of Maryland, College Park**
1865 **Bowie State University**
1866 **Towson University**
1886 **University of Maryland Eastern Shore**
1898 **Frostburg State University**
1900 **Coppin State University**
1925 **Salisbury University**
1925 **University of Baltimore**
1925 **University of Maryland Center for Environmental Science**
1947 **University of Maryland University College**
1966 **University of Maryland, Baltimore County**

RESPONSE TO LEGISLATIVE AUDIT REPORT
UNIVERSITY SYSTEM OF MARYLAND
FROSTBURG STATE UNIVERSITY
JUNE 1, 2009 TO JUNE 3, 2012

Sustainable Energy Research Facility (SERF)

Finding 1
FSU did not document the rationale for its selection of the construction site, did not obtain the required control agency approvals, and did not ensure construction costs were reasonable.

Recommendation 1
We recommend that FSU

a. in the future, comply with the aforementioned USM procurement policies, fully document the rationale for decisions related to procurements, and take the necessary steps to ensure it receives the best value;
b. submit the above project to USM and the Board of Public Works for retroactive approval; and
c. refer the aforementioned matter to the State Ethics Commission.

University response

a. FSU agrees and remains committed to fully complying with all procurement policies set by USM and will continue to be so committed. As OLA notes, FSU prepared and forwarded a detailed request for approval of this project and engaged in numerous dialogues with its counterparts over details of the project. At some point FSU proceeded in error without a formal response to the request and will take steps to ensure formal approvals are documented in the future. For example, although FSU forwarded documentation of site selection criteria to the grantors on the project in initial periodic reports they did not assure that the information was available in all project files. While there is no specific guidance in either State Law or USM policy as to means of documenting such decisions FSU will undertake to develop a more comprehensive method of capturing that information.

b. FSU agrees and will consult with our OAG representative to make sure FSU follows all appropriate protocols going forward. This includes appropriately seeking retroactive approval from USM and the Board of Public Works.

c. FSU agrees to refer the matter for review to the State Ethics Commission. We submit this in seeking guidance from the State Ethics Commission and FSU will abide by their conclusions. We wish to note that at this point in time, a conclusion as to whether actual conflict of interest occurred has not been determined.

RESPONSE TO LEGISLATIVE AUDIT REPORT
UNIVERSITY SYSTEM OF MARYLAND
FROSTBURG STATE UNIVERSITY
JUNE 1, 2009 TO JUNE 3, 2012

Information Systems Security and Control

Finding 2
Password controls and monitoring of critical systems were inadequate.

Recommendation 2
We recommend that FSU

a. regularly generate and review reports of changes to permission lists for the aforementioned critical applications,
b. log critical security and audit events for the human resources and student administration database and review all database security reports and retain documentation of these reviews, and
c. implement controls over passwords in accordance with the USM *Guidelines in Response to the State's IT Security Policy*.

University response
The University agrees with the OLA recommendations.

a. We have created a report to effectively audit and review the changes to permission lists for these applications.

b. We are currently TESTING a database audit which logs critical security and audit events for the human resources and student administration database which forwards events to our log management system where weekly review is conducted. We expect to have these systems running in our production systems by September 30, 2013.

c. Password complexity settings were changed in our directory system in accordance with the USM Guidelines in Response to the State's IT Security Policy in April 2012.

Finding 3
Intrusion Detection Prevention System (IDPS) coverage for FSU's network was not comprehensive.

Recommendation 3
We recommend that FSU provide adequate IDPS protection for its network (repeat). Specifically, we recommend that FSU

a. perform a documented review and assessment of its network security risks from untrusted sources and identify how IDPS and HIPS coverage should be best applied for its network (repeat), and

b. implement appropriate coverage based on this review.

University response
The University agrees with the OLA recommendations.

a. FSU reviewed the security risks from untrusted sources and decided to implement HIPS on critical web servers. This process was documented.

b. FSU has installed IDPS on all critical web servers identified in the review.

Finding 4
Proper security controls were not established over the virtual server environment.

Recommendation 4
We recommend that FSU

a. configure the host servers' virtualization software in accordance with the vendor's recommendations to help ensure adequate security over the resident virtual servers,
b. apply virtualization software patches in a timely manner to correct significant security-related vulnerabilities, and
c. send host server log messages to a log storage server on a separate server and perform regular reviews of these security logs with such reviews being documented and retained for audit verification purposes.

University response
The University agrees with the OLA recommendations.

a. Server settings were configured in accordance with VMware's recommended security settings.

b. Software patches were applied to the virtual environment. In addition, VMware updates will be included in the regular maintenance schedule to ensure host servers are up to date on patches.

c. All log messages are sent to our log server appliance. A regular review is performed and the documents are retained for audit verification.

AUDIT TEAM

Bekana Edossa, CPA, CFE
Audit Manager

Richard L. Carter, CISA
Stephen P. Jersey, CPA, CISA
Information Systems Audit Managers

Robert A. Wells, CPA
Senior Auditor

R. Brendan Coffey, CPA
Edwin L. Paul, CPA, CISA
Information Systems Senior Auditors

Marissa L. Eby
Jennifer L. Thompson
Staff Auditors

Eric Alexander, CPA
J. Gregory Busch
Information Systems Staff Auditors