



A REPORT
TO THE
MONTANA
LEGISLATURE

INFORMATION SYSTEMS AUDIT

*Data Reliability of the
Montana Automated
Educational Finance and
Information Reporting
System (MAEFAIRS)*

Office of Public Instruction

MARCH 2015

LEGISLATIVE AUDIT
DIVISION

14DP-02

**LEGISLATIVE AUDIT
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REPRESENTATIVES

RANDY BRODEHL, CHAIR
Randybrodehl57@gmail.com

VIRGINIA COURT
vcourtforlegislature@yahoo.com

MIKE CUFFE
mcuffe@interbel.net

DENISE HAYMAN
Rep.Denise.Hayman@mt.gov

RYAN OSMUNDSON
Ryanosmundson@gmail.com

MITCH TROPILA
tropila@mt.net

SENATORS

DEE BROWN
repdee@yahoo.com

TAYLOR BROWN
taylor@northernbroadcasting.com

SUE MALEK
senatormalek@gmail.com

MARY McNALLY
McNally4MTLeg@gmail.com

FREDRICK (ERIC) MOORE
mail@SenatorEricMoore.com

CYNTHIA WOLKEN
Sen.Cynthia.Wolken@mt.gov

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LEGISLATIVE AUDIT DIVISION

Tori Hunthausen, Legislative Auditor
Deborah F. Butler, Legal Counsel



Deputy Legislative Auditors:
Cindy Jorgenson
Angus Maciver

March 2015

The Legislative Audit Committee
of the Montana State Legislature:

This is our information systems audit of the Montana Automated Educational Finance and Information Reporting System (MAEFAIRS) managed by the School Finance Division of the Office of Public Instruction.

This report provides the Legislature information on the reliability of the data contained within, along with the accuracy of the entitlement calculations performed by MAEFAIRS. This report includes recommendations for enhancing general controls related to access, security, configuration management, and disaster recovery at the Office of Public Instruction.

We wish to express our appreciation to the personnel from the Office of Public Instruction for their cooperation and assistance during the audit.

Respectfully submitted,

/s/ Tori Hunthausen

Tori Hunthausen, CPA
Legislative Auditor

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APPOINTED AND ADMINISTRATIVE OFFICIALS

Office of Public Instruction

Denise Juneau, Superintendent

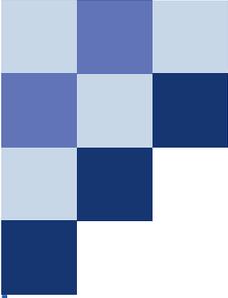
Dennis Parman, Deputy Superintendent

Madalyn Quinlan, Chief of Staff

Kenneth Bailey, Assistant Superintendent, Operations

Janelle Mickelson, Administrator, School Finance Division

James Gietzen, Administrator, Information Technology Services Division



MONTANA LEGISLATIVE AUDIT DIVISION

INFORMATION SYSTEMS AUDIT

Data Reliability of the Montana Automated Educational Finance and Information Reporting System (MAEFAIRS)

Office of Public Instruction

MARCH 2015

14DP-02

REPORT SUMMARY

In fiscal year 2014, MAEFAIRS was responsible for allocating \$772 million in state funding to over 400 Montana school districts. While MAEFAIRS accurately calculates entitlements, the Office of Public Instruction could make improvements in system access, security, configuration management, and disaster recovery to ensure that business process controls continue to operate effectively.

Context

MAEFAIRS was created 20 years ago to support the Office of Public Instruction (OPI) in calculating entitlements to school districts and special education co-ops based on reporting of enrollment, number of educators and licensed professionals, and number of American Indian Students. MAEFAIRS obtains information from two other sources—the Achievement in Montana system for student enrollment and the Terms of Employment Accreditation Master Schedule system for school district employment—along with data entered by over 370 users dispersed among the state’s school district. OPI personnel estimate there are approximately 200 calculations performed within the system. MAEFAIRS does not specifically distribute the monies to the school districts and co-ops. This is accomplished by the Payment system, which is also managed by OPI and directly interfaces with MAEFAIRS.

The audit team inspected general and business process controls associated with MAEFAIRS to determine the level of reliability of both the input and output data. The interface between MAEFAIRS and the Payment system was also examined.

Results

From the audit work conducted, we conclude OPI has established both internal and external controls associated with MAEFAIRS. The business process and interface controls implemented by OPI, both automated and manual, provide assurance that education entitlements are accurate, valid, and secure. However, the following general controls could be strengthened:

- ◆ User access control procedures
- ◆ Information security program plan
- ◆ Configuration documentation and management plan
- ◆ Disaster recovery testing

Recommendation Concurrence	
Concur	4
Partially Concur	0
Do Not Concur	0
Source: Agency audit response included in final report.	

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Chapter I – Introduction and Background

Introduction

The Office of Public Instruction (OPI) is responsible for distributing approximately \$1 billion dollars (fiscal year 2014) to Montana's school districts. Of that amount, approximately \$700 million came from the state general fund. OPI utilizes the Montana Automated Educational Finance and Information Reporting System (MAEFAIRS) for gathering school district budgets, annual revenue and expenditure reports, and other financial data to calculate entitlement amounts. The School Finance Division is in charge of monitoring and maintaining MAEFAIRS, with assistance provided by OPI's Information Technology Services Division. The magnitude of the entitlements calculated by MAEFAIRS raises interest for an examination of system controls associated with providing a level of surety that these entitlements are accurate.

Background

When discussing school district budgets, most of the attention is focused towards the state's general fund used primarily to finance instructional, administrative, facility maintenance, and other operational costs of a district not financed by other special purpose funds. The general fund budget has minimum and maximum levels that are calculated based on state entitlements. MAEFAIRS was created in 1994 to support OPI in calculating these entitlements to school districts and special education co-ops based on reporting of enrollment, number of educators and licensed professionals, and number of American Indian students. MAEFAIRS obtains information from two other sources – the Achievement in Montana system for enrollment and the Terms of Employment Accreditation Master Schedule system for employment. OPI personnel estimate there are between 150-250 calculations performed within the system. MAEFAIRS does not directly distribute the monies to the school districts and co-ops. This is accomplished by another OPI system that MAEFAIRS interfaces with. Users with access to MAEFAIRS are county/district clerks and occasionally school superintendents if they are responsible for the budget.

Audit Scope and Objectives

The scope of this audit focused on the reliability of MAEFAIRS to collect and accurately process data for calculating entitlements to Montana school districts. The following were the objectives of the audit:

1. Ensure input controls are established and tested within MAEFAIRS to effectively minimize erroneous data.
2. Determine whether controls are in place to ensure calculations within MAEFAIRS are accurate.

3. Examine the interface controls between MAEFAIRS and the Payment system.
4. Verify whether change controls exist for any additions and edits made to MAEFAIRS.
5. Determine whether disaster recovery procedures are established for MAEFAIRS and tested on a routine basis.

Methodology

The following is a general overview of the areas examined and the work performed during the course of the audit:

- ◆ Conducted interviews with staff from OPI and various school districts.
- ◆ Examined system access controls.
- ◆ Observed testing conducted by OPI staff to ensure internal data validations and screen edits are operating effectively.
- ◆ Verified the accuracy of the calculations performed by MAEFAIRS along with the OPI budget testing spreadsheet.
- ◆ Reviewed agency processes for making changes to programming language within MAEFAIRS.
- ◆ Examined access controls associated with the Payment system.
- ◆ Inquired about how changes to entitlements within the Payment system are accomplished and recorded.
- ◆ Reviewed disaster recovery plan for MAEFAIRS.

Audit Criteria

The Department of Administration's State Information Technology Services Division (SITSD) uses the publications from the National Institute of Standards and Technology (NIST) as the basis for information technology policies and standards within the Montana Operations Manual, specifically NIST 800-53 regarding security and privacy controls. Throughout this audit report, there will be occasional references to state policy which directly reflect NIST standards and guidelines.

Audit Summary

Based on our review, there are controls established in and around MAEFAIRS that ensure a level of accuracy with the data entered and the calculations performed. The Payment system securely interfaces with MAEFAIRS to obtain entitlements in order to distribute payments to school districts. In addition, while steps have been taken to provide reliable and relatively seamless disaster recovery capabilities, the testing of these capabilities could be improved. Access control, the security program, and configuration management were other areas that could be strengthened as well.

Chapter II – MAEFAIRS Business Processes

Introduction

Business Process controls are the automated and/or manual controls applied to business transaction flows that relate to the completeness, accuracy, validity and confidentiality of transactions and data during information processing. Automated controls are system-based, such as internal edits and validations used to ensure the correctness or accuracy of data entered. Manual controls are those that require human intervention; for example, the approval of transactions. For this audit of the Montana Automated Educational Finance and Information Reporting System (MAEFAIRS), we examined controls related to the validity of the input data and the completeness and accuracy of the entitlement calculations, for which both automated and manual controls are employed by the Office of Public Instruction (OPI).

Interfaces stem from the exchange of data between two computer applications, which may or may not reside on the same physical environment. Interface controls are the controls that reside over the timely, accurate, and complete processing of information between applications and other feeder and receiving systems on an ongoing basis. MAEFAIRS interfaces with a number of systems, such as the automated data import from Achievement in Montana and Terms of Employment, Accreditation, and Master Schedule. For the scope of this audit, we focused on the interface between MAEFAIRS and the Payment System, which calculates the actual dollar values issued to the school districts (entitlements). The Payment System factors in not only entitlement data calculated in MAEFAIRS, but information from other external systems, such as the Transportation application which calculates the funding for school buses in the districts. The migration of data between MAEFAIRS and Payment will be covered later in this chapter.

Validation of Input Data

We examined the process for manually entering information into MAEFAIRS and the controls that support the validity of that information. The audit team observed the system-user interface and tested its ease of use via the test database. The system is relatively user-friendly, with embedded prompts that walk you through the process of entering district information for entitlements. Known constants, such as figures set by the legislature, are fixed and cannot be changed. Also, edits and validations are programmed into MAEFAIRS to assist users with entering data. In the case that a question or concern arises, staff from the School Finance Division are available to assist. We spoke to users from several districts to obtain their perspectives on how MAEFAIRS operates. Of the school districts interviewed, it was unanimous that

the system works effectively and as intended, and when problems do arise, they are addressed in a timely fashion.

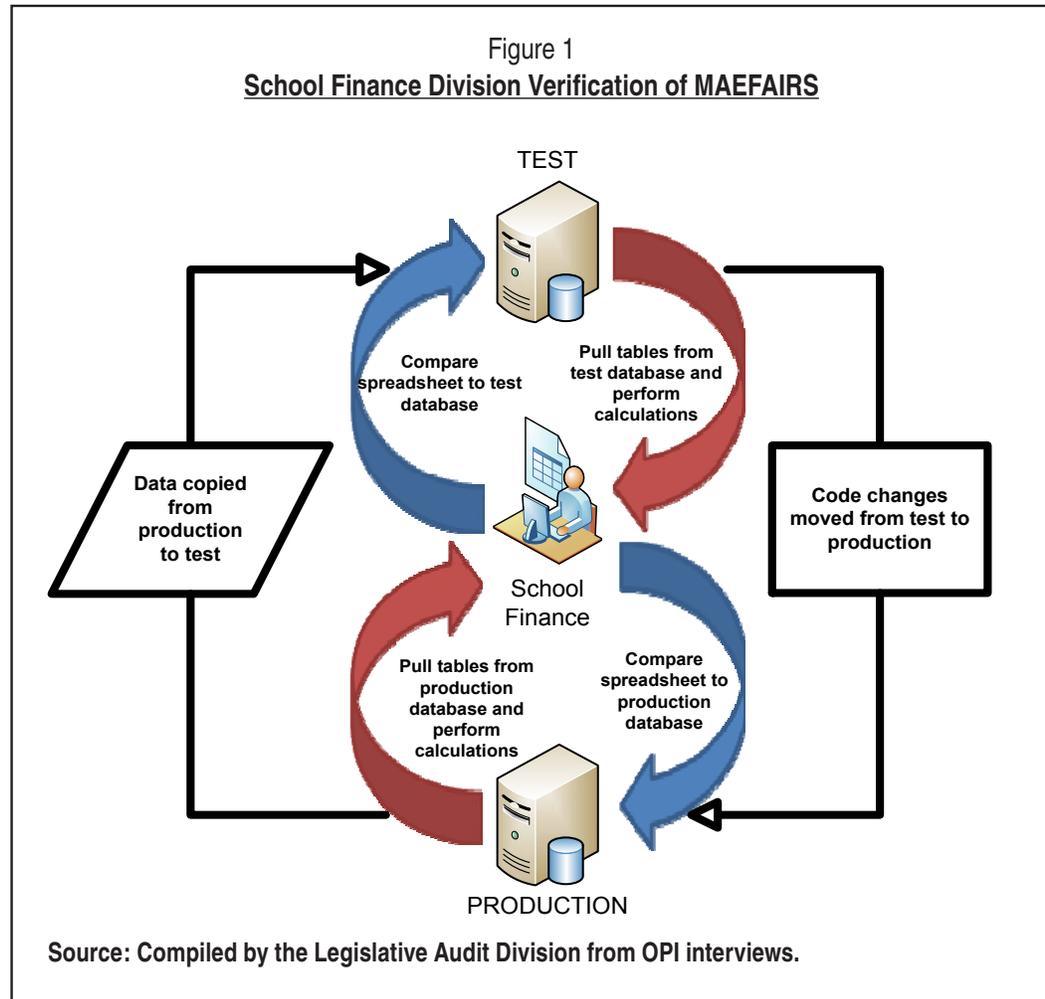
The staff from the School Finance Division conducts internal testing of MAEFAIRS to not only establish a configuration baseline, but to also confirm that all the edits and validations are working properly. The testers essentially attempt to “break” the system or find ways to enter irrelevant data without discovery by MAEFAIRS. The team is provided testing guidelines to help them through the process and to ensure all steps are accomplished for every school district in the state. Team meetings are called to discuss progress, along with documenting testing results. We observed one of these testing meetings, which included all available staff from the School Finance Division.

CONCLUSION

The Office of Public Instruction has established and continually tests input controls for the Montana Automated Educational Finance and Information Reporting System that effectively minimize erroneous data.

Completeness and Accuracy of Entitlements

There are numerous calculations performed by MAEFAIRS. An exact number could not be determined from interviews; however, it was estimated at approximately 200 calculations. Many of these calculations are dynamic—changing with each biennium, or possibly every year. This requires continued vigilance by the School Finance Division in order to provide assurance that these calculations are accurate and, in turn, entitlements allocated to the school districts are correct. To accomplish this, the School Finance Division provides tools to assist the districts with calculating their average number belonging (ANB), along with checking the entitlements calculated and eventually allocated. In addition, the School Finance Division confirms entitlement calculations for all school districts. The division initially completed only “spot checks” of a few selected districts for quality assurance purposes. They realized this was a critical step in managing the program and a valuable compensating control of an information system that is continually being modified. The division developed a state-wide spreadsheet that checks calculations performed by both the test and production databases of MAEFAIRS. Actual data, entered by school districts, is downloaded into the spreadsheet for entitlement verification. Figure 1 (see page 5) illustrates the process.



While the spreadsheet is used as a tool to check the test database after changes have been made, it is also used to confirm that code changes were properly moved to production. We obtained and analyzed the spreadsheet used by the division. We compared MAEFAIRS code to spreadsheet calculations for ANB and noted no differences. We also analyzed verification results. Our review determined this is a positive control to help ensure MAEFAIRS is accurately calculating school district entitlements.

CONCLUSION

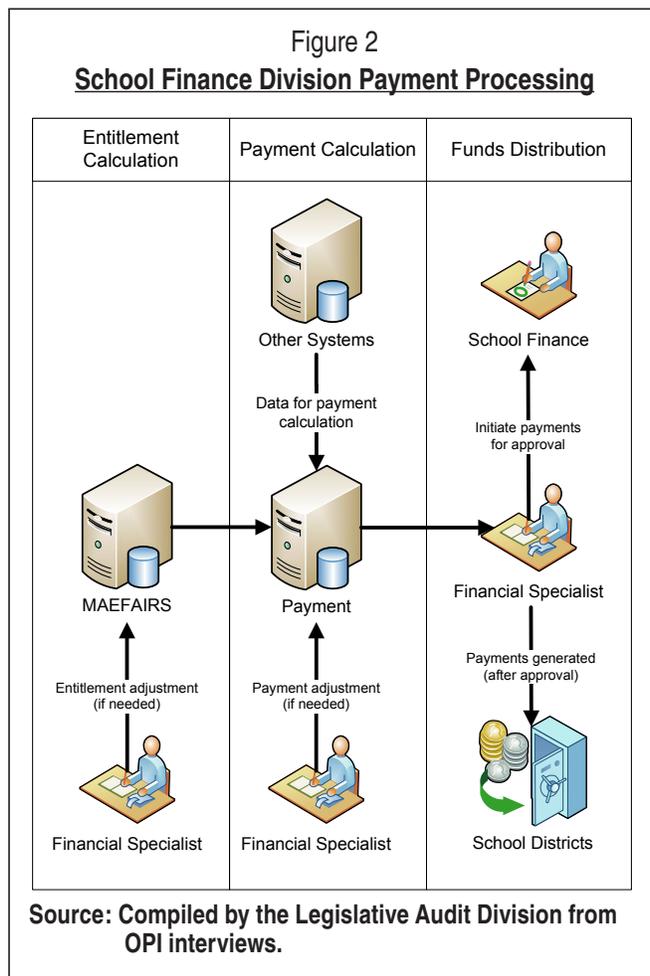
The Office of Public Instruction has employed effective business process controls that ensure entitlement calculations performed by the Montana Automated Educational Finance and Information Reporting System are accurate.

Migration of Data to Payment System

The interface between MAEFAIRS and the Payment system (Payment) is essentially one-way. Payment pulls data from MAEFAIRS to calculate funds allocated, but MAEFAIRS does not require any information from Payment to perform entitlement calculations. Even though the process is automated, the School Finance Division has the capability to access Payment to make adjustments if funds need to be recouped from the previous school year. Since this access introduces a level of risk to the completeness and accuracy of the information contained within Payment, controls have been implemented to oversee and approve the transactions created in Payment. Access to Payment is restricted to staff of the School Finance Division. In similar fashion as MAEFAIRS, individuals have to complete a user request form requiring approval from the administrator of the School Finance Division in order to gain access. Roles are assigned to each user, and the access list is much smaller and more tightly controlled than the access to MAEFAIRS due to the nature of the system and the number of individuals requiring access. The financial specialist is responsible for initiating payments. In addition, this individual can make adjustments to either entitlements within MAEFAIRS or payments within Payment if so required. Payment transactions are then combined

into a single batch file. This file is approved by the administrator of the School Finance Division, or the second in charge, the financial specialist supervisor. Since there are payments that go out each month, twice a year the administrator or the supervisor will step into the role of the financial specialist and create the payment transactions. Figure 2 helps explain the steps for processing payments.

There is no automated interface between Payment and the depository bank. Payments are manually entered into the system utilized by the bank to deposit funds, ACH Single Point. Reports are generated from both Payment and ACH



Single Point. Both of these reports are compared by the School Finance Division to ensure payments between the two systems correspond. From the information gathered pertaining to access to Payment and the data therein, we determined that controls are in place to ensure payments calculated are accurate with regards to entitlements.

CONCLUSION

The Office of Public Instruction has implemented interface controls between the Montana Automated Educational Finance and Information Reporting System and the Payment system, and these controls are working appropriately.

Chapter III – MAEFAIRS General Controls

Introduction

General controls are the policies and procedures that apply to all or a large segment of an entity's information systems and help ensure proper operation. These controls are applicable at the entity-wide, system, and application levels. For the purpose of this audit, controls were primarily examined at the system level. If general controls are inadequate, they can essentially hinder the effectiveness of business process controls, which were discussed in the previous chapter. This chapter addresses general controls which include access, security, configuration management, and contingency planning.

Access Control

By implementing access controls to information system resources, data owners minimize the risk of unauthorized access to data, equipment, and facilities. Access controls work closely with input controls in providing a level of surety that erroneous data has not been entered into the system. Thus, in accordance with the audit objectives, access was examined by the audit team. The process for obtaining access to the Montana Automated Educational Finance and Information Reporting System (MAEFAIRS) is similar to other Office of Public Instruction (OPI) information systems. A call is placed to the OPI help desk by the requestor, which is then forwarded to the School Finance Division. The requestor is then instructed to complete the user access form and return it to OPI. Once School Finance receives the form, a user role is assigned to the requestor and annotated on the form, which is then sent to the Information Systems Security Analyst at OPI to create the account and archive the form. Once the account has been created, the Information Systems Security Analyst sends an email to the user with a username and temporary password along with the role assigned. Roles depend on the responsibility of the user, and many users require multiple roles. Other than this email, all communication with the end user is done through the School Finance Division. If any changes to a user account are necessary, they would also be directed to division management.

Examination of Users

We requested a list of the user accounts within MAEFAIRS, which primarily included school district superintendents, clerks, and business managers. A much smaller number of user accounts belonged to staff from the School Finance Division in OPI. From this list, we determined there were a total of 374 users with access to MAEFAIRS. Of this total, 185 users were assigned more than one user role. There are 15 different roles available to be assigned to users in MAEFAIRS. The following is a breakout of the most common MAEFAIRS roles and the percentage of users assigned:

- ◆ Compensation/Expenditures = 19 percent
- ◆ Budget = 19 percent
- ◆ Enrollment = 19 percent
- ◆ Trustee Financial Statement = 19 percent
- ◆ Tuition = 17 percent
- ◆ All other roles = 6 percent

We analyzed the list of user accounts and identified users who had not logged into MAEFAIRS for more than 12 months. Of these users, ten were identified as not logging in since 2012. Further investigation discovered that of these ten individuals, six users no longer required access to MAEFAIRS due to employment changes. State policy requires an internal user with access to state information systems must notify the data owner when his/her employment status changes. In this case, internal users include school district employees with access to MAEFAIRS. Not all of the internal users are providing the required notification of employment change to the data owner. It is the responsibility of the data owner, essentially the School Finance Division, to periodically review and maintain an up-to-date user access list. There are measures that can be taken to assist in minimizing unauthorized access, such as including instructions on the access form to contact OPI in the case that access is no longer required, or to set up the system to lock accounts that have not been accessed for a given amount of time. In the case an unauthorized individual continues to gain access to the system, erroneous enrollment data could be entered or existing data could be altered that would affect entitlement calculations and potentially require additional resources to correct. For example, if a former school district employee was still able to access the system, and became disgruntled towards the district, he or she could alter enrollment information to negatively impact the entitlements allocated to that district.

RECOMMENDATION #1

We recommend the Office of Public Instruction implement procedures for ensuring only authorized individuals have access to the Montana Automated Educational Finance and Information Reporting System.

Security Management

Developing and maintaining a security program is required by statute. Section 2-15-114, MCA, states each department head is responsible for developing and maintaining written internal policies and procedures to ensure security of data. In support of this

law, state policy requires agencies to implement an information security program which is aligned with the security program guidance of the Federal Information Security Management Act (FISMA) and National Institute of Standards and Technology (NIST). A security program is defined as an organization-wide program that addresses information security for the information and systems that support the operations and assets of the organization, including those provided or managed by another organization, contractor, or other source. We determined during the assessment of MAEFAIRS that security documentation in support of a security program were either nonexistent or incomplete according to state policy and industry standards. Without the foundation of an agency security program, risk management and business processes could be adversely affected.

Information security is essential to any data system, and specific aspects of MAEFAIRS security were examined during this audit. While measures have been taken to address security within OPI, there are areas that should be strengthened, primarily concerning the security program. In the Information Technology Strategic Plan for OPI, the agency indicated it intends to align its security program with NIST standards. However, policies and procedures at both the organization and system-level that would be included in a security program, have yet to be developed. An integral piece of risk management, and essentially the security program, is an information security architecture. Information security architecture is a detailed road map that allows traceability from the highest-level strategic goals and objectives of organizations, through specific mission/business protection needs, to specific information security solutions provided by people, processes, and technologies. In order to assess whether information system security controls are consistent with the information security architecture, the agency must have this road map in place. If applicable, documented system-level plans that incorporate security policies and procedures specific to an information system are also required.

RECOMMENDATION #2

We recommend the Office of Public Instruction develop an Information Security Program Plan, including information security architecture and agency policies, in accordance with state law and policy.

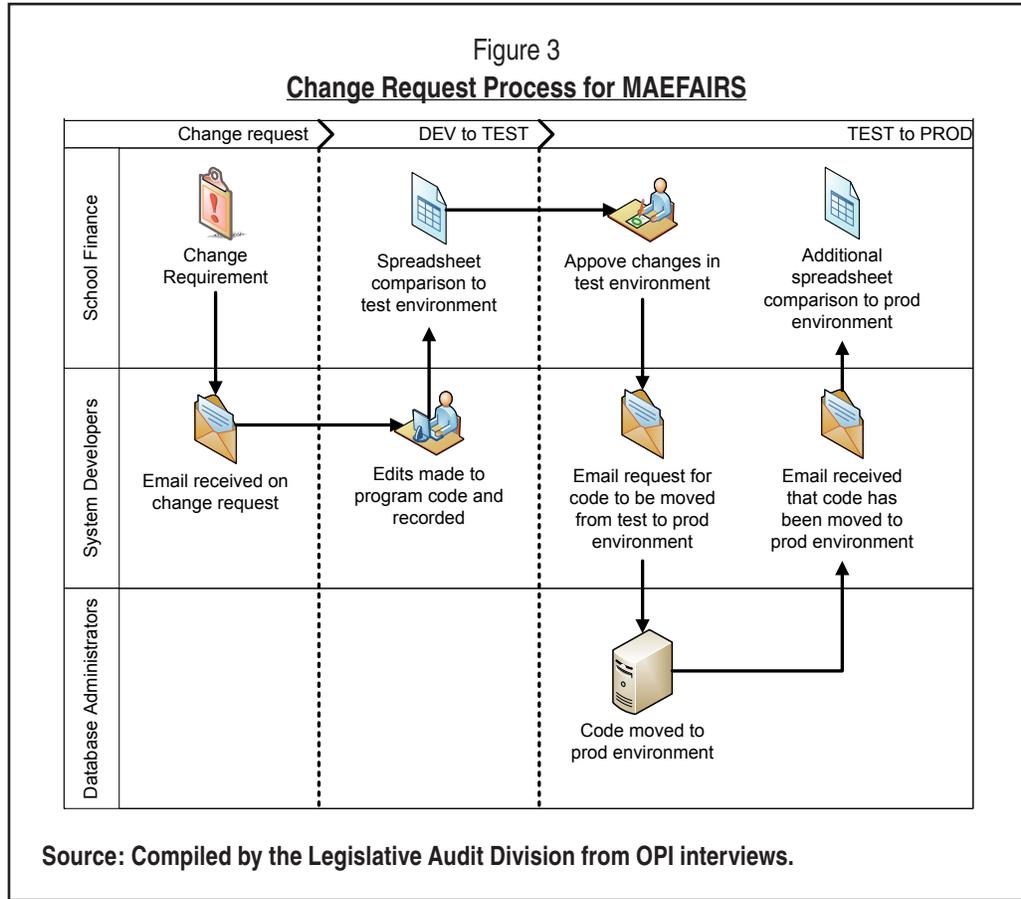
Configuration Management

Configuration management is a process that tracks and manages all components of an information system. Components include services, hardware, software, buildings,

people, and formal documentation and cover everything from a single server to the entire information technology section within a department. Effective configuration management ensures an organization is making informed business decisions, performing correct actions, and providing reasonable assurance that changes to an information system are authorized and the system is configured and operating securely and as intended. In order to execute configuration management, best industry practices stress the importance of not only establishing a baseline configuration of the system, but also the subsequent control and maintenance of an accurate inventory of any changes made to that baseline. Proper documentation includes the recording of these authorized changes, along with policies, plans and procedures related to the organization's configuration management. Configuration management works hand-in-hand with security management because any unauthorized change to the information system can have negative impacts to the security of that system and the information contained within.

Change Controls

During the audit, we identified controls to ensure the programming code for MAEFAIRS is secure and procedures are established for making modifications to code. Personnel from the School Finance Division in OPI meet during the summer to perform testing of MAEFAIRS in order to ensure the system is operating as expected. The testing protocol encompasses individual testers assigned as users with different school district roles, logging into the test environment of MAEFAIRS, and stepping through the screens to enter enrollment information. A testing guide is provided to the testers as a resource during the process. The group compiles notes on the results of testing, and meets several times over the course of two weeks to discuss progress. From this testing, a baseline configuration is established. Any changes to the MAEFAIRS baseline follows specific change control procedures. The change control process is illustrated in Figure 3 (see page 13).



Any change request to MAEFAIRS must come from the administrator of the School Finance Division, or the immediate subordinate, the finance specialist supervisor. In addition, changes must be approved by one of these individuals. All emails exchanged for the purpose of a MAEFAIRS programming code change request are kept by the system developers. The history of change requests (development to test to production) is also documented by the developers and all parties involved have access to this information for review. The developers lock-down program code and can track any changes made back to the date/time and the individual programmer.

CONCLUSION

The Office of Public Instruction has established procedures and controls regarding change management for the Montana Automated Educational Finance and Information Reporting System program code.

Documentation of Configuration

While OPI has established a process and controls regarding MAEFAIRS programming changes, there is a lack of documentation supporting configuration management of MAEFAIRS. Industry standards, such as NIST, require that configuration management policies, plans, and procedures (entity wide, system, and application levels) not only be developed, but also documented and updated as applicable. Examples of documentation include employee roles/responsibilities, change control and system documentation requirements, establishment of a decision-making structure, and configuration management training.

Another critical element to configuration management is the continued monitoring of the baseline configuration. Currently, for the school districts in Montana, there are three count dates for which information pertaining to their district must be entered into MAEFAIRS. It is primarily during these times that personnel from the School Finance Division take a closer look at functionality and operation of the system. These configuration examinations should be performed once before release, and routinely tested thereafter as indicated in a configuration management plan. While such monitoring is performed by School Finance Division staff, there is no documented agency policy instructing how often configuration examinations should occur.

RECOMMENDATION #3

We recommend the Office of Public Instruction strengthen configuration management of the Montana Automated Educational Finance and Information Reporting System by documenting configuration management policies, plans, and procedures.

Contingency Planning

In the case of an outage where MAEFAIRS capabilities are either lost or compromised, OPI must be able to assure its customers that the system will be restored to 100 percent operability within a given amount of time. This time frame depends on the criticality of MAEFAIRS in regard to the mission of the agency. We inquired about whether the agency had developed a disaster recovery plan, and if not, their current progress in doing so.

We noted OPI has taken steps in both developing a disaster recovery plan and testing its viability. OPI moved its equipment to the new Montana Data Center managed by the State Information Technology Services Division (SITSD). This provides improvements

to the prevention of system outages, in addition to redundancy and recoverability with backup equipment located at the secondary data center in Miles City, Montana. In cooperation with SITSD staff, OPI scheduled and completed testing of the back-up capability between MAEFAIRS servers in both locations. The results from this test were positive in all aspects, and service did cut-over as expected to the secondary site.

After further review of the disaster recovery plan for OPI, we noted the schedule for testing the disaster recovery plan, which includes the cut-over of services/applications to the Miles City Data Center, is not addressed. Industry standards do recognize that certain systems are not as critical in nature as others, but still require management to assess the risk of problems to the existing contingency plan and develop policy on the frequency and extent that testing should occur. If policy does not dictate how or how often disaster recovery testing should be completed, procedures could become outdated and/or not applicable.

RECOMMENDATION #4

We recommend the Office of Public Instruction further define the requirements of disaster recovery testing, including the frequency of tests, within its agency disaster recovery plan.

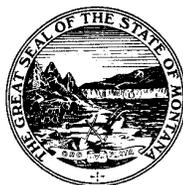
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STATE OF MONTANA

Denise Juneau
Superintendent



www.opi.mt.gov
(406) 444-5643

March 11, 2014

Ms. Tori Hunthausen, CPA
Legislative Auditor
Legislative Audit Division
PO Box 201705
Helena, MT 59620-1705

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RE: MAEFAIRS Audit

Dear Ms. Hunthausen:

Following is our response to recommendations contained in the Office of Public Instruction's (OPI) Montana Automated Educational Finance and Information Reporting System (MAEFAIRS) audit report.

Recommendation #1

We recommend the Office of Public Instruction implement procedures for ensuring only authorized individuals have access to the Montana Automated Educational Finance and Information Reporting System.

OPI Response: We concur. The OPI will develop and document a procedure to review access to the Montana Automated Educational Finance and Information Reporting System on a regular basis and remove access that is no longer required. We have already conducted an initial review as a result of the audit finding and modified access for 16 users.

Recommendation #2

We recommend the Office of Public Instruction develop an Information Security Program Plan, including information security architecture and agency policies, in accordance with state law and policy.

OPI Response: We concur. The OPI places the utmost importance on the security and privacy of data and data systems the agency uses in completing its mission. Furthermore, the OPI is committed to taking additional steps to comply with the security standards as described in state policy.

Significant turnover in the OPI security officer position has delayed progress on the OPI Security Program Plan. This position has recently been filled and this individual will be assigned the development and maintenance of the Plan.

The security officer position also manages the day-to-day activities of assigning access to OPI systems. These activities represent a barrier to progress on developing an Information Security Program Plan as they take a significant portion of the security officer's time. To mitigate this daily commitment, the OPI has hired a part-time temporary worker to help with the daily activities that will allow the security officer to devote more time to developing the Plan.

The OPI will develop a plan that describes the steps and proposed timeline to comply with state policy. We will coordinate our activities with the Enterprise Security Program officer recently hired by SITSD. We anticipate that the plan will take six to nine months to develop and that the tasks described in the plan will take multiple years to complete.

Recommendation #3

We recommend the Office of Public Instruction strengthen configuration management of the Montana Automated Educational Finance and Information Reporting System by documenting configuration management policies, plans and procedures.

OPI Response: We concur. Within the next 6 months, the OPI will document the processes and procedures currently in place and develop an agency policy that enforces the use of the documented procedures.

Recommendation #4

We recommend the Office of Public Instruction further define the requirements of disaster recovery testing, including the frequency of tests, within its agency disaster recovery plan.

OPI Response: We concur. The OPI has updated the existing Disaster Recovery plan to state that we will conduct the disaster recovery test annually.

Sincerely,



Denise Juneau
Superintendent of Public Instruction

