Automated System Development and Maintenance

Department of Administration
Department of Social and Rehabilitation Services
Department of Labor and Industry

This report provides:

- Background information regarding automated system development and maintenance.
- Information and recommendations regarding system development and maintenance activities specific to three state agencies.
- Information regarding concerns common to all three state agencies and recommendations for increasing the effectiveness of operations.

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Members of the performance audit staff hold degrees in disciplines appropriate to the audit process. Areas of expertise include business and public administration, statistics, economics, computer science, communications, and engineering.

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The Legislative Audit Committee of the Montana State Legislature:

This is our performance audit of Automated System Development and Maintenance at the Department of Administration, the Department of Social and Rehabilitation Services, and the Department of Labor and Industry. This report contains recommendations concerning management of system development and maintenance activities within the three agencies. Department responses are contained at the end of the report.

We wish to express our appreciation to the staff of each of the departments for their cooperation and assistance.

Respectfully submitted,

Scott A. Seacat
Legislative Auditor
Automated System Development and Maintenance

Department of Administration
Department of Social and Rehabilitation Services
Department of Labor and Industry

Members of the audit staff involved in this audit were Dave Gould, Kent Rice, and Kimberly A. Stenberg.
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Introduction

The Legislative Audit Committee requested a performance audit of automated system development and maintenance activities of the Department of Administration's Application Services Bureau (ASB). Our preliminary review indicated the need to extend our performance audit to other state agencies due to the amount of system development and maintenance activity outside ASB. This report addresses our audit of automated system development and maintenance activities within three state agencies: the Department of Administration, the Department of Social and Rehabilitation Services, and the Department of Labor and Industry.

The objectives of the audit included identifying and evaluating controls which ensure automated systems are developed and maintained in an efficient and effective manner. We compared agency system development and maintenance methodologies to industry standards. In addition, we determined whether systems developed and maintained within the agencies are operating as intended.

Automated System Development and Maintenance

The life of an automated system can be divided into three basic areas: development, operations, and maintenance. Development pertains to the design, formation, testing, documentation, and implementation of a new system. Operations are the day-to-day procedures and processes that keep a system functioning. Maintenance provides upkeep and sustains the operation of a previously developed system.

A widely used and proven approach in system development is to divide work into phases which are logical and manageable. This approach is used by private industry, governments, and the three agencies in our review. This formalized method of system development is known as the system development life cycle.

Once a system has been implemented, development is complete and operation and maintenance begin. Most data processing organizations have an operations section to control day-to-day processing. The operations section is responsible for running
Report Summary

jobs submitted by system users, printing reports, and monitoring and reporting system problems.

System maintenance can be divided into phases similar to those for system development. System maintenance can include modifications, enhancements, error correction, and general maintenance. Each of the three agencies we reviewed uses some form of a system maintenance life cycle. The main difference between system development and system maintenance is the size of projects.

Agency Operations

ASB is the only state entity which provides system development and maintenance services to other state agencies. Personnel in state agencies other than those within ASB also conduct system development and maintenance. However, staff responsibilities for system development and maintenance are limited to the department where they are employed.

The Department of Administration has statutory authority to establish policies and a statewide plan for the operation and development of data processing for state government. The department also has authority for control and coordination of the implementation of information systems in state government. The department has involved agencies in state data processing by creating the Information Technology Advisory Council and working with the Information Technology Managers Group.

Department of Administration

At the Department of Administration, system development and maintenance is conducted by staff within the Application Services Bureau (ASB). ASB charges fees for services to cover costs. The system development life cycle established by ASB consists of three phases: preliminary analysis, prototyping, and system test and installation. Agencies also contract with ASB for system maintenance services. Maintenance includes any activities required to keep a system operational and responsive. Services provided include: production recovery, minor maintenance and enhancement, and consultation.
ASB Related Issues

During our review at ASB, we noted areas where system development and maintenance activities were operating as described. The system development and maintenance methodologies established by ASB appear logical and compare to industry standards. ASB management has a process in place to periodically update these methodologies. Users of the systems we reviewed at ASB are satisfied with the development and maintenance processes, and believe the systems are beneficial.

System maintenance, for the systems we reviewed, appears to be completed in a timely manner. ASB staff appear to have backgrounds, experience, and skills necessary to develop and maintain automated systems. In addition, staff are kept up-to-date on appropriate technologies.

We did note an area where improvements could be made at ASB. The following section summarizes our findings.

Post-Implementation Review
Development standards suggest a post-implementation review as the final phase of a system development life cycle methodology. A post-implementation review can be used to evaluate the effectiveness of the development process. ASB management has not implemented any formal post-implementation review.

ASB is not getting formal feedback on its system development process. If problems occur as a result of deficiencies in ASB development techniques, future development projects may have similar problems. Also, if agencies are not satisfied with ASB services, future contracts may not be considered.

The other two agencies included in our review have established post-implementation review as part of the system development process. To increase the effectiveness of current methodologies and ensure system quality, ASB management should develop and implement policies for reviewing systems and agency satisfaction.
Department of Social and Rehabilitation Services

The Operations and Technology Division (OTD) is responsible for system development and maintenance for the department. Two bureaus within the OTD provide system development and maintenance services. The Internal Mainframe Systems Bureau is responsible for mainframe development and maintenance. The Microcomputer Applications Bureau handles microcomputer based development and maintenance.

OTD's new system development life cycle consists of the following five phases: conceptual, definition, design, implementation, and evaluation/acceptance. System maintenance services provided include: production recovery, maintenance, and enhancement.

OTD Related Issues

During our review at OTD, we identified areas where system development and maintenance activities were operating as described. System development and maintenance methodologies have been established by management and compare to industry standards. Users of the systems we reviewed at OTD are satisfied with the development and maintenance processes, and believe the systems are beneficial.

System maintenance, for the systems we reviewed, appears to be completed in a timely manner. Staff appear to have experience and skills necessary to develop and maintain automated systems.

We did note an area where improvements could be made. The following section discusses training at OTD and includes our recommendation for improvement.

Training

Overall, we found the department provides only minimal training for system development and maintenance staff. SRS does not have a formal training program, nor does it formally track employee training. Staff receive some training which appears appropriate. However, the amount of training received does not appear to keep staff up-to-date on relevant data processing technology.
Training is provided to improve or enhance employees' abilities to perform job duties and can improve employee morale. Without a formal training program, data processing staff have less formal access to changing standards and/or up-to-date development and maintenance technologies. We believe OTD management should identify training needs and implement a formal employee training program to meet these needs.

Department of Labor and Industry

Currently, three divisions within the Department of Labor and Industry (DOLI) are responsible for system development and maintenance: Job Service, Unemployment Insurance, and Centralized Services. Staff from various sections within these three divisions complete system development and maintenance activities.

The department's system development life cycle consists of six phases: project definition, analysis, design, coding, testing, and implementation. System maintenance services provided include: production recovery, maintenance, and enhancement.

DOLI Related Issues

During our review at DOLI, we noted areas where system development and maintenance activities were operating as described. DOLI's system development and maintenance methodologies appear logical and compare to industry standards. Users of the systems we reviewed are satisfied with the development and maintenance processes, and believe the systems are beneficial.

System maintenance, for the systems we reviewed, appears to be completed in a timely manner. Staff appear to have necessary skills and experience to develop and maintain automated systems. Staff are also kept up-to-date on appropriate technologies.

We did note an area where improvement is needed. No one entity is responsible for data processing activity within the department. The following section discusses this issue and includes our recommendation for improvement.
Report Summary

Separation of Development/Maintenance Staff
Staff within three divisions of DOLI conduct system development and maintenance. No single entity has input/control over development and maintenance work conducted by personnel within DOLI. There are differences in the way system development and maintenance is conducted within different divisions of the department. Department management has established general guidelines for department personnel, but there is no formal process to ensure all personnel follow similar standards.

Development of standards and coordination of system development and maintenance activities should help reduce possible duplication of effort. In addition, department standards and coordination should help maximize consistency and system compatibility, which should help increase information sharing capabilities. We believe the department should define roles and responsibilities for all DOLI data processing personnel. One entity should be given responsibility for direction and control of data processing in the department, including development of department-wide standards.

Common Concerns
All three agencies included in our review have established standards for developing and maintaining automated systems. We found personnel have necessary skills to develop and maintain automated systems. We did note several system development and maintenance concerns common to all three agencies included in our audit. The following sections summarize our findings, including recommendations for improvement. Our recommendations relate to increasing the effectiveness of current operations.

Coordination in System Development
We asked data processing personnel in the agencies we reviewed what communication and coordination they have with other state agencies. We found very little communication and coordination between state agencies regarding system development. Potential benefits may never be realized without some form of communication or coordination. As a result, potential cost savings, increases in efficiency, and other benefits to agencies
and the state may be lost. In addition, there may be some duplication of effort by agencies developing similar systems.

The Department of Administration has established Montana Operations Manual (MOM) policies for state agencies to follow for planning and managing system development projects. It is the responsibility of each state agency to develop and implement system development methodologies. We recommend all three agencies incorporate MOM policy regarding coordination and information sharing into current methodologies.

Testing is a requirement in all industry standards regarding system development and maintenance, including standards developed by the three agencies in our review. Standards also exist regarding test documentation. Our review indicates noncompliance with current testing policies in all three agencies. Although it appears staff within these three agencies conduct some testing during system development and maintenance, appropriate documentation of testing is not formally maintained. Due to the lack of appropriate test documentation, there is no assurance required testing was completed.

All areas critical to a system may not be tested if test plans are not developed, reviewed, and approved. Failure to adequately test significant system components could create problems during future system operations. According to industry guidelines, correcting system errors and/or deficiencies after a system is in production is much more time consuming and costly than if done during initial development.

If test documentation is not maintained and reviewed, management cannot properly evaluate system and staff performance. Without documentation of test results, management also cannot adequately determine whether a system or system change is ready for implementation. We recommend all three agencies develop more specific guidelines on testing procedures and test documentation content and retention. Management should also enforce testing and test documentation requirements.
We compared system documentation standards of the three departments to industry standards. We also reviewed documentation for several systems developed and/or maintained by each of the agencies. Current documentation standards of each department are comparable to industry standards. However, we found established policies and procedures are not followed. It does not appear all required system documentation is maintained for system development and maintenance projects. In addition, documentation is not consistent between projects.

Lack of documentation is a common problem associated with development and maintenance of automated systems. Inconsistency and/or lack of documentation can create problems and inefficiencies in operations. System documentation is critical for development and maintenance of automated systems. Management of all three agencies should emphasize the importance of system documentation to the overall project. In addition, management should ensure complete documentation exists, as appropriate, for all system development and maintenance projects.

Accurate, timely, and appropriate management information is essential for providing effective control. Industry standards suggest collection and analysis of numerous types of management information as part of project control. ASB management uses a project control software package to monitor system development and maintenance projects. Neither OTD nor DOLI have management information systems to monitor system development and maintenance. In addition, there is no formal process in place for evaluating performance in completing work requests on time. Management does not analyze time or costs associated with system development and maintenance.

If management information is inaccurate or appropriate information is not collected, program operations could suffer. Lack of management information could cause management to make uninformed decisions which negatively affect staff and/or the quality of systems. We believe management at all three agencies should review current project management software for adequacy of monitoring projects and generating management information. Once reviewed, necessary action should be taken to
ensure adequate information is available to make informed decisions. Management should also gather information for use in measuring system and staff productivity.

Performance Appraisals

We examined employee personnel files to determine whether performance appraisals are completed in accordance with the Administrative Rules of Montana. Performance appraisals are completed at ASB. We found only one of eight OTD personnel files reviewed had a current performance appraisal. In addition, we found four of eight DOLI personnel files reviewed did not have a current performance appraisal.

Section 2.21.6411, ARM, states performance appraisals are to be completed for each full-time and part-time position during established appraisal periods of not more than one year's duration. Appraisals provide direction and motivation for employees. Failure to complete periodic performance appraisals makes it difficult for management to monitor and document employee productivity and program effectiveness. We recommend OTD and DOLI management complete timely appraisals of all staff.

System Development and Maintenance Standards

OTD management has no formal process for reviewing and updating standards. DOLI also has no formal process for reviewing and updating system development and maintenance standards. Established standards provide general controls over system development and maintenance activity. Controls direct data processing staff on procedures which must be followed when developing new systems and/or changing existing systems. Standards must be carefully planned and continually monitored to ensure effective implementation.

Lack of formal and up-to-date standards can cause inconsistencies in operations and impede staff performance. Without a formal standards monitoring process, the status of system development and maintenance functions may not be known. Staff also may not be developing and maintaining systems in the most efficient and effective manner. Management at OTD and DOLI need to formalize a process to review and update standards on a regular basis.
Chapter I
Introduction

Introduction

The Legislative Audit Committee requested a performance audit of automated system development and maintenance activities of the Department of Administration's Application Services Bureau (ASB). We conducted a preliminary review to determine the need for a performance audit and identify potential audit issues. Our preliminary review indicated the need to extend our performance audit to other state agencies due to the amount of system development and maintenance activity outside ASB. This report addresses our audit of automated system development and maintenance activities within three state agencies:

1. The Department of Administration.
2. The Department of Social and Rehabilitation Services.
3. The Department of Labor and Industry.

These agencies were selected based on number of staff involved with system development and maintenance.

Audit Objectives

The objectives of the audit were to:

1. Identify and evaluate controls which ensure automated systems are developed and maintained in an efficient and effective manner.

2. Compare agency system development and maintenance methodologies to industry standards.

3. Determine whether systems developed and maintained within the agencies are operating as intended.

4. Review compliance with applicable statutes, rules, and regulations regarding automated system development and maintenance.

5. Determine the implementation status of applicable recommendations resulting from a 1984 audit of the Systems Development Bureau, now ASB, Department of Administration, conducted by the Office of the Legislative Auditor.
Chapter I
Introduction

Audit Scope and Methodology

During preliminary audit work, we interviewed Application Services Bureau staff and reviewed system documentation and management information. We obtained general information regarding system development and maintenance activities conducted by other state agencies. We interviewed agency personnel involved directly with system development and maintenance to obtain input on current methodologies and procedures. Based on preliminary work we selected the three agencies noted previously for our performance audit.

The audit was conducted in accordance with governmental auditing standards for performance audits. Formal audit work was directed at automated system development and maintenance methodologies and controls. We did not include the computer operations function of each agency as part of our review. We evaluated current agency methodologies to determine if methods are logical and comparable to industry standards. We reviewed information and documentation at each agency and compared our observations to agency methodologies. In addition, we evaluated current agency procedures for periodically reviewing and updating system development and maintenance policies and procedures.

Staff qualifications were reviewed to determine if personnel have necessary skills to develop and maintain automated systems. Staff training records were reviewed to determine whether staff are kept up-to-date on appropriate technologies. Procedures for reviewing work and supervising staff were evaluated to determine whether system development and maintenance activities are properly monitored.

We selected two systems developed and maintained by each agency and reviewed documentation for each system. We compared system documentation to agency requirements to determine if staff follow established policies and procedures. We verified documentation of approval of development and maintenance activities by agency management and user representatives.
Chapter I
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We compared available cost and time estimations to actual results as part of our evaluation of controls over the system development and maintenance processes. We reviewed documentation to determine whether development and maintenance is completed in a timely manner. If possible, we reviewed development and maintenance documentation for the same systems.

We obtained input from users of the systems. We asked users for input on their involvement with system development and maintenance activities. Users were asked about their satisfaction with department procedures, current system operations, and if the systems are beneficial. Our audit also included a review of training and documentation provided to system users.

Audit scope included a review of management controls over contracted system development and maintenance services to ensure agency and state needs were met. The Department of Social and Rehabilitation Services is the only agency of the three reviewed currently contracting for system development and maintenance services.

We evaluated management information to determine if management had sufficient information to make informed decisions. We reviewed agency procedures for monitoring development, maintenance, and costs. We identified formal reports generated by department management and determined how management used these reports to evaluate project success.

Our review included determining whether a process is in place at each agency to ensure system development and/or maintenance will be beneficial to the state. We evaluated staff and user input and information obtained during our review to aid in our determination.

Finally, we reviewed applicable audit recommendations made to the Department of Administration's Systems Development Bureau (now called ASB) from a 1984 audit conducted by the Office of the Legislative Auditor. Our review was conducted to determine the implementation status of prior recommendations.
Chapter I
Introduction

We incorporated applicable recommendations into our performance audit work.

Data Limitations

Government auditing standards require the disclosure of any constraints imposed on the audit approach because of data limitations. Documentation kept during system development and maintenance at the three agencies reviewed is not complete and is inconsistent. Types of limited information included estimated and actual costs and time frames, development and maintenance project success factors, and measurement of system efficiency and effectiveness. We were hindered in achieving our audit objectives because of limited documentation. This data limitation also adversely affects management of system development and maintenance activities. The data limitations and their effects are discussed in detail in Chapters III through VI.

Compliance

We reviewed agency compliance with statutes and administrative rules relating to automated system development and maintenance operations. Generally, we found all three agencies to be in compliance with state laws and administrative rules.

We identified noncompliance related to completion of performance appraisals within the Department of Social and Rehabilitation Services and the Department of Labor and Industry. This issue is discussed further in Chapter VI.

Implementation Status of Prior Audit Recommendations

As part of our performance audit, we reviewed the implementation status of prior audit recommendations made in the 1984 Electronic Data Processing Audit (84DP-12) of the Systems Development Bureau (SDB), Department of Administration. SDB has since been renamed the Application Services Bureau (ASB). The following table summarizes the status of prior audit recommendations.
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Table 1

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* Recommendations not reviewed due to being outside the scope of this audit.

Source: Compiled by the Office of the Legislative Auditor.

No action was taken on 5 of the 13 prior audit recommendations not fully implemented. Four of these five prior audit recommendations are addressed under recommendations made in Chapter VI of this performance audit report. The remaining audit recommendation is no longer applicable.

Issue for Further Study

During our performance audit we identified an issue which we believe warrants further study. Our audit scope did not include an evaluation of the efficiency and effectiveness of systems within the three agencies reviewed. We did not review and evaluate program languages, code structures, system structures, system responsiveness, error rates, or other performance measures.

Costs for system development and maintenance are high, especially if services are contracted out to the private sector. Controls are needed to ensure systems meet requirements and benefit agency operations and the state. Currently, there does not appear to be any procedures in place in state government to conduct cost benefit analyses of automated systems. We believe this type of review is necessary to ensure systems benefit agency operations and the state. These reviews could help identify inefficiencies in automated systems and prevent unnecessary costs for systems development and maintenance.
# Chapter II
## Background

### Introduction

This chapter provides an overview of system development and maintenance. It describes current industry techniques and provides general background information. The techniques described in this chapter are generally used by the three agencies in our review.

### Automated System Development and Maintenance

The life of an automated system can be divided into three basic areas: 1) development, 2) operations, and 3) maintenance (sometimes referred to as support). Development pertains to the design, formation, testing, documentation, and implementation of a new system. Operations are the day-to-day procedures and processes that keep a system functioning. Maintenance provides upkeep and sustains the operation of a previously developed system. The following sections discuss these three areas in further detail.

### System Development Life Cycle (SDLC)

A widely used and proven approach in system development is to divide work into phases which are logical and manageable. This approach is used by private industry, governments, and the three agencies in our review. This formalized method of system development is known as the system development life cycle (SDLC). The SDLC can vary from agency to agency, but in general, the life cycle follows six phases.
Chapter II
Background

SDLC Initiation

The life cycle starts with the recognition of a problem or identification of a need for a new system to improve current operations. The general nature and scope of the project should be clearly defined and approved. A feasibility study is completed and includes a review of alternative solutions and a cost benefit analysis. If the feasibility study is approved, the life cycle continues.

SDLC Definition

The second phase involves development of system requirements to describe how the system will function. This phase includes development of system flowcharts, program narratives, file layouts, and data descriptions. Requirements for how the system will function as well as requirements for what types of data the system will accept are developed during this phase.

SDLC Design

In the third phase, the design specifications for implementing the system are developed. This includes the design of the system, subsystems, and individual programs. In addition, complete descriptions of all data, files, and how the data will be
stored are produced. A detailed model of the final system is produced during this phase.

**SDLC Development and Testing**

The fourth phase is when actual programming or coding is completed. Design and program specifications are converted to computer code. Once written, program code is tested. When programs are functioning properly, subsystems are tested. Finally, the system as a whole is tested. The system is further tested by the user. System documentation is finalized including test results, user manuals, and operation manuals. If necessary, a conversion plan to convert from the old system to the new system is developed. After the system is operational, a post-implementation review is conducted to determine if user needs and system requirements were met.

**SDLC Operation and Maintenance**

Once the system is developed and accepted by the user, the operation and maintenance phase begins. Maintenance is considered the final and ongoing phase of an SDLC.

**SDLC Variations**

Various modifications of the traditional SDLC are continually developed and used by system development organizations. All three agencies within our review use a variation of the traditional SDLC. In the traditional SDLC, one phase is completed prior to starting the next phase. One approach to varying the SDLC is to start subsequent phases prior to completion of previous phases. The following figure depicts this variation of the SDLC.
Chapter II
Background

Prototyping

Another variation of the SDLC is prototyping. The Application Services Bureau at the Department of Administration uses prototyping. Staff within the Office of Information Services at the Department of Labor and Industry can use prototyping if preferred. Prototyping is based on building and using a model of a system during the SDLC. The initial version of the prototype is an outline of the final system. This "prototype" is modified during each phase of the SDLC until a fully functional system is implemented. Prototyping increases active participation by the user which helps assure system requirements are met.

System Operation

Once a system has been implemented and a post-implementation review conducted, development is complete and operation and maintenance begin. Most data processing organizations have an operations section to control day-to-day processing. The operations section is responsible for running jobs submitted by system users, printing reports, and monitoring and reporting system problems.
System maintenance can be divided into phases similar to those for system development. System maintenance can include modifications, enhancements, error correction, and general maintenance. Each of the three agencies we reviewed uses some form of a system maintenance life cycle. The main difference between system development and system maintenance is the size of projects. As a result, system maintenance activities are often more brief and direct. The following figure shows a typical system maintenance life cycle.

**Figure 3**

**System Maintenance Life Cycle**

Typical

- Record
- Analyze
- Design/Code
- Test
- Implement

Source: Compiled by the Office of the Legislative Auditor from industry standards.

**Record and Analyze**

In the first phase, user requests for system changes are recorded and assigned for analysis. The change is then analyzed and approved for completion. This phase is similar to the feasibility study completed during system development.

**Design/Code and Test**

The third phase involves designing and coding the change. Phase three is similar to the phases of the SDLC where design and coding are conducted. Testing and training take place during phase four. Procedures for testing during maintenance are the same as for development.
Finally, the completed change is implemented and system monitoring continues. The entire process is completed for additional modifications and enhancements.

All modifications and enhancements to a system should be approved prior to completion, and tested and documented prior to being placed into production. User management should periodically evaluate system operations to identify problems and the need for maintenance or development of a new system.

Many state agencies have staff involved with system development and maintenance. One distinction exists within state automated system development and maintenance - the Application Services Bureau (ASB) at the Department of Administration is the only state agency which provides system development and maintenance services to other state agencies. In addition, the Department of Administration is statutorily responsible for establishing policies and a statewide plan for the operation and development of data processing in state government. The department is also responsible for review and approval of all contracts for private data processing services.

Personnel in state agencies other than those within ASB also conduct system development and maintenance. However, staff responsibilities for system development and maintenance are limited to the department where they are employed. For example, staff within the Data Processing Bureau at the Department of Social and Rehabilitation Services provide system development and maintenance services for the department only. The following table lists state agencies and the number of staff involved with system development and maintenance. These figures are based on preliminary review findings from September 1992.
Chapter II
Background

Table 2

<table>
<thead>
<tr>
<th>System Development and Maintenance Agencies and FTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEPARTMENT/AGENCY</td>
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<tr>
<td>Administration (ASB)</td>
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<tr>
<td>Agriculture</td>
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<tr>
<td>Commerce</td>
</tr>
<tr>
<td>Corrections &amp; Human Services</td>
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<td>Public Service Regulation</td>
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<tr>
<td>Revenue</td>
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<td>Social &amp; Rehabilitation Services</td>
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<tr>
<td>State Auditor's Office</td>
</tr>
<tr>
<td>State Lands</td>
</tr>
<tr>
<td>Transportation</td>
</tr>
<tr>
<td>TOTAL</td>
</tr>
</tbody>
</table>

Source: Compiled by the Office of the Legislative Auditor.

House Joint Resolution 48

House Joint Resolution (HJR) 48 passed during the 1991 Legislative Session directed the Legislative Finance Committee to study information management services within state government. A subcommittee of the Legislative Finance Committee and the Legislative Audit Committee was formed to complete the study. As part of its mandate, the subcommittee was to evaluate whether the Department of Administration has effectively undertaken its responsibilities in the development, application, and management of data processing systems for state government.

In its report to the legislature (November 6, 1992), the subcommittee made several recommendations to the Department of Administration related to system development and maintenance within Montana. Recommendations included:
Chapter II
Background

-- develop a definition for data processing services that ensures the department will review major or costly data processing service contracts.

-- continue with and refine efforts to coordinate with other state agencies through the Data Processing Management Group and the Data Processing Advisory Council (DPAC).

-- explicitly state in its rate development process and budget request anticipated subsidies among computer-related services and clearly articulate under what conditions an ongoing subsidy is considered appropriate.

-- centrally publish computer policies by compiling a summary of policies in a single publication and incorporating central policies in Montana Operations Manual.

-- expand its role in agency development of large projects by using DPAC as a focal point for agency discussions and planning for large systems that could serve several agencies.

The department concurred with all recommendations made by the subcommittee. The DPAC, now called the Information Technology Advisory Council, also supported the recommendations made by the subcommittee.

Data Processing Oversight

Section 2-17-501(1), MCA, gives the Department of Administration authority to establish policies and a statewide plan for the operation and development of data processing for state government. Section 1-0210, Montana Operations Manual (MOM), further defines statutes by giving the department authority for control and coordination of the implementation of information systems in state government.

Due to recent changes in statute and recommendations from various committees, including the HJR 48 subcommittee, the Department of Administration has become more involved in data processing in Montana. The department has involved agencies in state data processing by creating the Information Technology Advisory Council (ITAC) and working with the Information Technology Managers Group (ITMG). Information Services Division (ISD), Department of Administration, encourages
interaction and information sharing, and emphasizes communication and coordination through the ITAC and the ITMG. ISD staff encourage agencies to discuss system development projects and plans at ITAC and ITMG meetings. In addition, ISD is finalizing an updated version of its data processing directions and guidelines document which addresses system development.
This chapter provides background information on system development and maintenance activities within the Application Services Bureau (ASB), Information Services Division (ISD), at the Department of Administration. It also discusses specific issues related only to ASB.

At the Department of Administration, system development and maintenance is conducted by staff within the Project Development Section (PDS) of the Application Services Bureau. PDS staff also provide mainframe system development and maintenance services to other state agencies as requested. The following figure shows ISD's current organization.

The Application Services Bureau is authorized 34 full-time equivalent (FTE) with 21 FTE allocated to the Project Development Section. These 21 FTE include 1 secretary, 3 supervisors, 16 information systems specialists, and 1 vacant supervisor position.

For fiscal year 1992-93, ASB had nine development projects. Two projects were completed and seven remained active. In
addition, ASB had 12 support/maintenance contracts. During fiscal years 1988-89 through 1992-93, ASB started 23 development/enhancement projects. Of these 23 projects, 20 were completed and 3 were stopped prior to system implementation. Income and expenses for ASB for the past four fiscal years are as follows.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Income</td>
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<td>$826,245</td>
<td>$845,404</td>
<td>$798,044</td>
</tr>
<tr>
<td>Expenses</td>
<td>701,245</td>
<td>811,866</td>
<td>892,587</td>
<td>854,227</td>
</tr>
<tr>
<td>Difference</td>
<td>$(51,760)</td>
<td>$(14,344)</td>
<td>$(47,183)</td>
<td>$(56,183)</td>
</tr>
</tbody>
</table>

Source: Application Services Bureau records.

PDS charges fees for services to cover costs. Service charges for fiscal year 1992-93 were $36 per hour. ISD’s cash balance is used to cover differences between income and expenses. This cash balance is derived from mainframe processing charges. According to Statewide Budgeting and Accounting System information, ISD’s unreserved fund balance for fiscal year 1992-93 is approximately $3,902,985.

ASB System Development

The system development life cycle (SDLC) established by ASB consists of three phases: 1) preliminary analysis, 2) prototyping, and 3) system test and installation. ASB’s development process starts with a request from a customer (an agency).

Preliminary Analysis

Since agencies contract with ASB for development services, ASB assumes the initial phase of the system development life cycle, which includes a feasibility study and cost benefit analysis, is completed by the agency prior to requesting service. ASB’s involvement in the process starts with development of system requirements, which is normally the second phase of a traditional system development life cycle. A preliminary analysis of customer needs and system requirements is completed and a cost
estimate is developed by ASB. If the customer approves the preliminary analysis, the project proceeds to the second phase.

Prototyping - Three Levels

During the second phase, system requirements are refined and an operational system is designed and developed. The project is divided into three levels, and each level or prototype adds to the previous level. After completion of the level three prototyping phase, a fully functional automated system exists.

System Test and Installation

The final phase involves system testing and installation of the system. ASB tests the system internally first, then turns the system over to the customer for testing and approval. Testing is completed to verify the system meets customer needs. During testing, the majority of errors and discrepancies should be identified and addressed. ASB’s final step is implementation of the new system. The system is placed into production status when approved by the customer. At this point the project is complete.

ASB System Maintenance

When a system is approved by the customer, ASB is no longer responsible for the system. However, agencies can contract with ASB for system maintenance services. A service agreement is developed and approved by ASB and the user agency. Service agreements are usually one year in length.

Maintenance includes any activities required to keep a system operational and responsive. Services provided include: 1) production recovery, 2) minor maintenance and enhancement, and 3) consultation. Production recovery is correction of problems to maintain proper system operation. Minor maintenance and enhancements include system changes to maintain consistent operation or strengthen the system in some fashion. Staff correct problems and complete system changes as necessary using procedures similar to those used for development. Consultation is time spent with agency personnel discussing system related subjects for a system under a service agreement.
Chapter III
Department of Administration

ASB Contracted Services

We did not review current procedures for contracted services at ASB. The Information Services Division has a $200,000 biennial appropriation for consulting services, but has not contracted for system development or maintenance services in the past four fiscal years, 1988-89 to 1991-92. ISD did hire consultants to provide other types of software support during this same time period ($137,738 total).

ASB Related Issues

Introduction

During our review at ASB, we noted areas where system development and maintenance activities were operating as described. The system development and maintenance methodologies established by ASB appear logical and compare to industry standards. ASB management has a process in place to periodically update these methodologies. Users of the systems we reviewed at ASB are satisfied with the development and maintenance processes, and believe the systems are beneficial.

System maintenance, for the systems we reviewed, appears to be completed in a timely manner. ASB staff appear to have backgrounds, experience, and skills necessary to develop and maintain automated systems. In addition, staff are kept up-to-date on appropriate technologies.

We did note one area where improvements could be made. The following section discusses post-implementation review at ASB, and includes our recommendation for improvement.

Post-Implementation Review

ASB provides system development services to state agencies. Once a system is implemented and accepted by an agency, ASB is no longer responsible for the system. If an agency does not specifically request a post-implementation review from ASB, an evaluation of the development process is not completed.
Chapter III
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The Office of the Legislative Auditor conducted an Electronic Data Processing Audit of the Systems Development Bureau, now the Application Services Bureau (ASB), and released a report in 1984. A recommendation was made to establish a post-implementation review process. To date, ASB management has not implemented any formal post-implementation review.

Development standards suggest a post-implementation review as the final phase of a system development life cycle methodology. A post-implementation review can be used to evaluate the effectiveness of the development process. The review determines whether original system objectives and requirements were met. Post-implementation reviews also provide an opportunity for assessing customer satisfaction. If an agency is dissatisfied with ASB's system development efforts, a post-implementation review would enable the agency to convey its concerns. This would help ASB management identify deficiencies in its methodology.

The other two agencies included in our review have established post-implementation review as part of the system development process. A post-implementation review of TEAMS (The Economic Assistance Management System) conducted by management of the Department of Social and Rehabilitation Services identified several problems with the system. These problems were brought to the TEAMS contractor and changes were made to correct problems. As a result, TEAMS is a better system. Without this review, TEAMS problems may not have been identified.

ASB is not getting formal feedback on its system development process. If problems occur as a result of deficiencies in ASB development techniques, future development projects may have similar problems. Finally, if agencies are not satisfied with ASB services, future contracts may not be considered.

To increase the effectiveness of current methodologies and ensure system quality, ASB management should develop and implement policies for reviewing systems and agency satisfaction. According to management, staffing priorities and customer
Chapter III
Department of Administration

budget limitations have prevented development of a post-implementation review process. This type of review would be part of the development service provided by ASB. ASB charges fees for services so agency development costs would increase. A brief review could limit increased costs. Management agrees with our findings and plans to develop policy for providing post-implementation review as an optional service to state agencies.

Recommendation #1

We recommend the Application Services Bureau implement post-implementation review as part of its methodology to ensure system requirements are met and to evaluate customer satisfaction.
Chapter IV - Department of Social and Rehabilitation Services

Introduction

This chapter provides background information on system development and maintenance activities within the Operations and Technology Division (OTD) at the Department of Social and Rehabilitation Services (SRS). It also discusses specific issues related only to OTD identified during our performance audit.

Operations and Technology Division (OTD)

SRS recently completed a reorganization. During our audit, the Office of Management Analysis and Systems was responsible for system development and maintenance for the department. The recent reorganization created a new division, the Operations and Technology Division, with responsibility for system development and maintenance.

Two bureaus within the OTD provide system development and maintenance services for the department. The Internal Mainframe Systems Bureau (IMSB) is responsible for mainframe development and maintenance. The Microcomputer Applications Bureau (MAB) handles microcomputer based development and maintenance. The MAB was implemented in August 1991. The following figure shows OTD's current organization.
There are 14 full-time equivalent (FTE) positions within OTD responsible for system development and maintenance. This includes two bureau chiefs, two special project directors, two supervisors, and various levels of Information Systems Specialist (ISS) positions.

Currently, the OTD has three system maintenance projects under contract with the private sector. The OTD has one system development project under contract at this time. The IMSB has no development projects and eighteen support/maintenance projects in progress. The MAB has four development projects in progress and seven support/maintenance projects. Department personnel indicate approximately 90 to 95 percent of staff activity involves system maintenance. Recently, all large development projects have been contracted out to the private sector. During the past two fiscal years, one contracted and three internal system development projects were completed.

Table 4 details expenses for OTD for the past three fiscal years.
Chapter IV - Department of Social and Rehabilitation Services

### Table 4

<table>
<thead>
<tr>
<th>Operations and Technology Division</th>
<th>System Development/Maintenance Expenses</th>
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<tbody>
<tr>
<td>Mainframe</td>
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<td>Microcomputer</td>
<td>0</td>
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<tr>
<td>Contracted*</td>
<td>9,781,083</td>
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<tr>
<td>TOTALS</td>
<td>$10,182,663</td>
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</tbody>
</table>

*Includes TEAMS, SEARCHS, and MMIS

Source: Operations and Technology Division records.

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**OTD System Development**

The OTD recently formed a standing committee to review system development and maintenance policies and standards. The committee proposed a new system development methodology which OTD management reviewed and approved. OTD's new system development life cycle consists of the following five main phases: 1) conceptual, 2) definition, 3) design, 4) implementation, and 5) evaluation/acceptance. The development process starts with a request from a department employee with proper authority for requesting development and maintenance services.

**Conceptual Phase**

The conceptual phase includes a preliminary evaluation of an idea for automation. A statement of need or a problem statement is developed during this phase. Tasks also include an initial cost benefit analysis and an impact analysis.

**Definition and Design**

The second phase requires identification of system functional requirements. Tasks include identifying current system functions, new system requirements, and resource requirements. A rough project management plan for the next two phases is developed.

In the next phase comprehensive program and design specifications are developed. Tasks include designing files and database structures, documenting various procedures, and developing project plans for testing, training, and implementation. The design phase also includes coding and testing programs, testing
procedures and the entire system using test data, and initiating the implementation/ conversion plan.

**Implementation and Evaluation/Acceptance**

During the implementation phase, the system is integrated into day-to-day operations. Tasks include generating user documentation, identifying and training users, and creating an implementation schedule. The final phase includes an evaluation of the benefits of the system, and a formal acceptance of the system from management and user staff.

**OTD System Maintenance**

The system maintenance process also starts with a request from a department employee with proper authority. Maintenance includes any activities required to keep a system operational and responsive. Services provided include: 1) production recovery, 2) maintenance, and 3) enhancement. Production recovery is correction of problems to ensure proper system operation. Maintenance and enhancements include system changes to maintain consistent operation or strengthen the system in some fashion. Staff correct problems and complete system changes as necessary or requested using procedures similar to those used for development.

**OTD Contracted Services**

SRS contracts for development and maintenance services for larger, more complex systems. SRS recently contracted for development and maintenance of TEAMS (The Economic Assistance Management System) and SEARCHS (System for the Enforcement And Recovery of Child Support). The department has contracts for development and maintenance services for MMIS (Montana Medicaid Information System) and the General Relief Assistance and Project Work Program System.

We reviewed department policy for contracting system development and maintenance services to determine if current procedures assure system needs are met in the most efficient and effective manner. The following sections summarize our observations.
Management considers the size of a project and the complexity of a system to determine whether or not to contract with the private sector for development and maintenance services. Management’s philosophy for system maintenance is to contract with the entity who develops a system for a minimum of three years after implementation. Management believes it is critical to a successful project to have expertise from the start, and to keep that expertise until the system is operating smoothly.

First, the department completes an internal requirements analysis to determine system needs. An RFP (request for proposal) is then developed and sent out to potential contractors. The department also surveys other states for similar systems already in operation. At the same time the department obtains input from vendors. In addition, federally funded projects require development of an Advanced Planning Document.

Information from all sources is compiled and an evaluation of RFP responses is made. The department develops RFP evaluation criteria which must be met before a contractor is considered for selection. Each RFP is scored according to the evaluation criteria. The department selects the low-bid from qualified finalists, then negotiates a contract.

Our audit included a review of the contract for TEAMS and TEAMS documentation. Our review of the TEAMS contract indicates various controls over system development and maintenance. TEAMS has a full-time contract manager responsible for day-to-day operations. The development contract required reports for various phases of the project. Department management reviewed and approved each report. All reports for TEAMS development were completed and the majority met initial time schedules set by the contractor.

There are performance criteria in the TEAMS maintenance contract which must be met. The department receives monthly reports from the contractor and holds monthly status meetings regarding TEAMS performance. A committee made up of department management and contractor personnel reviews system change requests from TEAMS users and establishes
priorities. The contractor completes and implements all changes to the system.

The department completed a survey of TEAMS users. As part of our review, we also contacted several TEAMS users and obtained input on TEAMS operations. The responses we received were similar to those compiled by the department. Overall, users appear to like TEAMS and believe it helps them complete their jobs more efficiently.

In addition, the Office of the Legislative Auditor recently completed an Electronic Data Processing (EDP) audit of TEAMS (93DP-31). EDP audit staff believe TEAMS meets its established objectives and is operating as intended.

TEAMS Costs

According to OTD management, quality system development and maintenance is expensive. TEAMS cost approximately $10.4 million to develop. The state funded approximately $1.6 million of the total cost. The department's contract for facilities management (maintenance) of TEAMS is over $2.8 million per year. This does not include costs incurred for operations at the Information Services Division, Department of Administration.

Facilities management includes, among other items, maintenance, support, and enhancements required to keep TEAMS current with state program requirements and technical environment. For example, if food stamp requirements change, the contractor is responsible for modifying TEAMS to meet new program requirements. Contract staffing levels require a minimum of 14 professional staff and 6 qualified computer programmers and programmer analysts on site. In summary, it appears the contract process used by SRS has controls built in to ensure department needs are met.
OTD Related Issues

Introduction

During our review at OTD, we identified areas where system development and maintenance activities were operating as described. System development and maintenance methodologies have been established by management and compare to industry standards. Users of the systems we reviewed at OTD are satisfied with the development and maintenance processes, and believe the systems are beneficial.

System maintenance, for the systems we reviewed, appears to be completed in a timely manner. Staff appear to have experience and skills necessary to develop and maintain automated systems.

We did note one area where improvements could be made. The following section discusses training at OTD and includes our recommendation for improvement.

Training

As part of our audit, we reviewed training provided to OTD system development and maintenance personnel. Overall, we found the department provides only minimal training for these staff. SRS does not have a formal training program, nor does it formally track employee training. Staff receive some training which appears appropriate. However, the amount of training received does not appear to keep staff up-to-date on relevant data processing technology.

We developed criteria to evaluate the types and amounts of training received by staff. We created a matrix based on general job responsibilities for personnel in ISS, supervisory, and management positions, and total hours of training received. Type of training related directly to job responsibilities. Amounts of training were ranked as low (less than 10 hours a year), medium, or high (more than 40 hours a year). Five of eight personnel files examined had no documentation indicating an adequate amount of training, based on the above criteria. For example, one ISS position file had no documentation of development or

One of the key components in the management of personnel is the provision of training. Training is provided to improve or enhance employees' abilities to perform job duties and can improve employee morale.

Without a formal training program, data processing staff have less formal access to changing standards and/or up-to-date development and maintenance technologies. Lack of training may cause staff to use ineffective or out-dated procedures without being aware of the problem. As a result, system quality may be jeopardized which could lead to problems with future system operations.

OTD management does not analyze staff needs to determine if training is necessary. Supervisors we talked with said staff could use more technical training. All staff we talked with believe they are not kept up-to-date on current technologies.

According to management, the training budget does not have enough funds to provide ongoing training. However, according to Statewide Budgeting and Accounting System (SBAS) information, OTD expended approximately $10,700 for training, including technical publications, in fiscal year 1991-92. OTD expended only about $3,100 for training in fiscal year 1992-93, of which approximately $1,100 was unrelated to system development and maintenance. According to OTD management, the department scaled down its training budget in fiscal year 1992-93. The OTD requested funding for training for the 1995 biennium based on expenditures during fiscal year 1991-92.

In comparison, the Application Services Bureau (ASB), Department of Administration, expended approximately $14,800 for training in fiscal year 1992-93. ASB has established an ongoing training program for staff and continues to analyze employee training needs.
We believe OTD management should identify training needs and implement a formal employee training program to meet these needs. Formal training should help increase employee efficiency and effectiveness. As a result, the quality of system development and maintenance should increase. This will provide customers increased assurance of quality systems.

OTD management indicates training is contingent on funding. Current funding will only allow implementation of a limited training plan. Management is aware of deficiencies and is reviewing the training program at the Applications Services Bureau, Department of Administration, to help identify possible solutions. Staff will attend computer training this fall, and plan to train other department staff. In addition, OTD staff are developing a system for a division within the department to track staff training. OTD plans to utilize this system after implementation.

**Recommendation #2**

**We recommend the Operations and Technology Division:**

A. Analyze staff training needs.

B. Implement a training program to meet identified needs.
Chapter V
Department of Labor and Industry

Introduction

This chapter provides background information on system development and maintenance activities within the Department of Labor and Industry (DOLI). It also discusses a specific issue related only to DOLI identified during our performance audit.

Department of Labor and Industry (DOLI) Reorganization

The Department of Labor and Industry recently completed an extensive reorganization as the result of a task force recommendation. While completing our performance audit, the Office of Information Services (OIS) provided system development and maintenance services for the department. Our work concentrated on OIS operations. As a result of the department's reorganization, OIS is defunct. OIS system development and maintenance staff who were dedicated to specific division operations were decentralized to those divisions. Remaining OIS staff were reorganized under the new Information Services Bureau, Centralized Services Division. According to management, staff within the Centralized Services Division will coordinate system development and maintenance activities for the department.

Currently, three divisions within DOLI are responsible for system development and maintenance: 1) Job Service, 2) Unemployment Insurance, and 3) Centralized Services. Staff from various sections within these three divisions complete system development and maintenance activities. The following figure shows DOLI's current organization.
Figure 6

Department of Labor and Industry Organization (partial - as of 9-93)

Department of Labor and Industry

Job Service Division

Administrative Support Bureau

Apprenticeship and Training Bureau

Unemployment Insurance Division

Administrative Support Section

Research and Analysis Bureau

Centralized Services Division

Information Services Bureau

Source: Compiled by the Office of the Legislative Auditor from department records.

There are 19 full-time equivalent (FTE) positions involved with system development and maintenance at DOLI. Of these, 6 FTE work within the Job Service Division, 6 FTE work within the Unemployment Insurance Division, 4 FTE work within the Centralized Services Division, and the remaining 3 FTE work within the Employment Relations Division. In addition, 3 FTE within Centralized Services are involved with system operations.

At the time of our audit, OIS had five development projects and six support/maintenance projects in progress. In addition, OIS had one contract with the private sector for system support. During fiscal years 1989-90 through 1991-92, OIS completed seven development/maintenance projects.

Expenses for OIS for the past two fiscal years are as follows.
Chapter V
Department of Labor and Industry

Table 5
Office of Information Services
System Development/Maintenance Expenses

<table>
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<tr>
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<th>FY 1991-92</th>
<th>FY 1992-93</th>
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<td>Personal Services</td>
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<tr>
<td>Operating Expenses*</td>
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<tr>
<td>Equipment</td>
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<tr>
<td><strong>TOTALS</strong></td>
<td><strong>$892,934</strong></td>
<td><strong>$868,236</strong></td>
</tr>
</tbody>
</table>

*Includes contracted services of $37,532 and $48,568, respectively.

Source: Office of Information Services records.

DOLI System Development

OIS's system development life cycle consisted of the following six phases: 1) project definition, 2) analysis, 3) design, 4) coding, 5) testing, and 6) implementation. This methodology was developed over the past three years. The development process starts with a request from a user (a department employee with proper authority for requesting development and maintenance services).

Project Definition

In the first phase, project definition, a decision is made on the feasibility of the project. Activities include defining project goals and scope, developing measurable objectives, and defining a tentative plan.

Analysis and Design

The second phase involves analysis of current system operations and new user needs. Activities include gaining an understanding of what the user wants in the new system, defining functional requirements, completing a cost benefit analysis, and starting a test plan. In the next phase high level and low level designs are developed. High level design activities include developing diagrams and specifications, determining general file structures and input/output requirements, and continuing to develop a test plan and project work plan. Low level design activities include developing more detailed diagrams, defining data requirements, designing screens and reports according to the high level design, and determining whether the design meets goals, scope, objectives, and requirements.
Chapter V
Department of Labor and Industry

Coding, Testing, and Implementation

The next two phases, coding and testing, provide a working computer system based on requirements from previous phases. Activities for these phases include coding programs, testing programs, procedures and the entire system using test data, deriving expected test results, and determining if project objectives and requirements have been met. The final phase, implementation, includes developing an implementation schedule and training schedule, completing a follow-up survey with the user, and obtaining formal acceptance and project sign-off.

DOLI System Maintenance

The system maintenance process also starts with a request from a user. Maintenance includes any activities required to keep a system operational and responsive. Services provided include: 1) production recovery, 2) maintenance, and 3) enhancement. Production recovery is correction of problems to ensure proper system operation. Maintenance and enhancements include system changes to maintain consistent operation or strengthen the system in some fashion. Staff correct problems and complete system changes as necessary or requested using procedures similar to those used for development.

DOLI Contracted Services

We did not review procedures for contracted services at OIS. Contractors have been used in the past, but were not hired recently to provide system development or maintenance services. There is one exception; OIS contracted with the private sector for support of a system which the same company developed several years ago. DOLI does not utilize development or maintenance services provided by the Information Services Division, Department of Administration.
Chapter V

Department of Labor and Industry

DOLI Related Issues

Introduction

During our review at DOLI, we noted areas where system development and maintenance activities were operating as described. DOLI's system development and maintenance methodologies appear logical and compare to industry standards. Users of the systems we reviewed are satisfied with the development and maintenance processes, and believe the systems are beneficial.

System maintenance, for the systems we reviewed, appears to be completed in a timely manner. Staff appear to have necessary skills and experience to develop and maintain automated systems. Staff are also kept up-to-date on appropriate technologies.

We did note one area where improvement is needed. No one entity is responsible for data processing activity within the department. Staff within several divisions of the Department of Labor and Industry are responsible for system development and maintenance. The following section discusses this issue and includes our recommendation for improvement.

Separation of Development/Maintenance Staff

As mentioned previously, staff within three divisions of DOLI conduct system development and maintenance. During our review, we contacted personnel from these divisions and obtained input on development and maintenance responsibilities. While our work in these divisions was limited, we did note no single entity has input/control over development and maintenance work conducted by personnel within DOLI.

The Administrative Support Bureau within the Job Service Division is responsible for both mainframe and microcomputer system development and maintenance. Staff complete work as needed and requested by Job Service personnel. In addition, staff within the Apprenticeship and Training Bureau are responsible for maintaining systems controlled by the federal government. According to bureau management, staff only complete
system development and maintenance activities as needed to provide data services.

Two sections within the Unemployment Insurance (UI) Division are also responsible for system development and maintenance: 1) Administrative Support, and 2) Research and Analysis. Staff within these two sections complete work as needed and requested by UI system users. Separation of responsibilities in this division is similar to the Job Service Division. One section completes department system development and the other section is responsible for maintenance of federal government systems.

In addition, staff within the Information Services Bureau, Centralized Services Division, provide system development and maintenance services for divisions without data processing support. This bureau is comprised of staff who were not decentralized from OIS.

There are differences in the way system development and maintenance is conducted within different divisions of the department. Each division follows its own system development and maintenance methodologies. Department management has established general guidelines for department personnel, but there is no formal process to ensure all personnel follow similar standards.

Development of standards and coordination of system development and maintenance activities should help reduce possible duplication of effort. In addition, department standards and coordination should help maximize consistency and system compatibility, which should help increase information sharing capabilities.

The department's current funding structure contributes to the current situation. Each division receives funding directly. Division management allocates funding to its programs. The department's centralized services function receives funding from the divisions it serves. Each division, with the exception of the Centralized Services Division, operates individually. As a result, no single entity controls or oversees department data processing.
activities to ensure system development and maintenance is consistent and does not duplicate other department activity.

We believe the department should define roles and responsibilities for all DOLI data processing personnel. One entity should be given responsibility for direction and control of data processing in the department, including development of department-wide standards. This should help increase interdepartmental communication and coordination.

According to management, a goal of DOLI is to be more focused department-wide. The department plans to form a core group made up of information technology managers from several divisions within DOLI. This core group will be responsible for coordinating data processing activity within the department.

Recommendation #3

We recommend the Department of Labor and Industry assign direction and control of data processing activity to one entity within the department.
This chapter discusses system development and maintenance concerns common to all three agencies included in our audit: 1) the Application Services Bureau (ASB); 2) the Operations and Technology Division (OTD); and 3) the Office of Information Services (OIS). Although OIS is now defunct, staff and responsibilities still remain within the Department of Labor and Industry (DOLI). Some staff from OIS were decentralized and the remaining staff were reorganized under the new Information Services Bureau. Three divisions in the department are now responsible for system development and maintenance. As a result, our findings and recommendations are still applicable to DOLI.

We noted areas where system development and maintenance activities were operating as documented and described to us. The most important of these relates to system development and maintenance methodologies. All three agencies included in our review have established standards for developing and maintaining automated systems. We also reviewed qualifications of a sample of staff within the three agencies in our review. We found personnel have necessary skills to develop and maintain automated systems. The following sections summarize our findings, including recommendations for improvement. Our recommendations relate to increasing the effectiveness of current operations.

As part of our audit, we asked data processing personnel in the agencies we reviewed what communication and coordination they have with other state agencies. We found very little communication and coordination between state agencies regarding system development.

Section 1-0232, Montana Operations Manual (MOM), states interdepartmental sharing should be considered when developing systems. This section of the MOM further states, "All agency development procedures should incorporate a review of existing software to determine if an alternative to custom programming would be cost beneficial."
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Systems developed by agencies to increase efficiency and effectiveness of operations, no matter how large or small, may be beneficial to other state agencies. However, potential benefits may never be realized without some form of communication or coordination. As a result, potential cost savings, increases in efficiency, and other benefits to agencies and the state may be lost. In addition, there may be some duplication of effort by agencies developing similar systems.

For example, during House Joint Resolution (HJR) 48 subcommittee meetings, officials from the judiciary branch said if system planning and development were coordinated, SRS could have incorporated child support activities of the courts into its child support enforcement system (SEARCHS). Instead, these two agencies have two different systems monitoring similar activities. At some point these two systems need to be integrated to increase child support enforcement coordination.

Section 1-0232, MOM, states cooperation with and consideration of systems in other state agencies can reduce the cost of information needed by multiple agencies. The HJR 48 subcommittee recommended all state agencies take into account interdepartmental coordination in system planning and feasibility studies.

The Department of Administration has established MOM policies for state agencies to follow for planning and managing system development projects. It is the responsibility of each state agency to develop and implement system development methodologies, which incorporate MOM policies. This should help increase possibilities for realizing benefits to agencies and the state.
Recommendation #4

We recommend the Application Services Bureau, the Operations and Technology Division, and the Department of Labor and Industry incorporate Montana Operations Manual policy regarding coordination and information sharing into current system development methodologies.

System Testing and Test Documentation

Testing is a requirement in all industry standards regarding system development and maintenance, including standards developed by the three agencies in our review. Generally, there are four types of testing: 1) unit or program, 2) integration or module, 3) system, and 4) acceptance. Unit testing refers to testing of individual programs. Integration testing involves testing of programs as a group or subsystem within a system. Prior to acceptance testing, all programs and subsystems are assembled and tested as a working system. This is called the system test. The final level of testing is the acceptance test. Acceptance testing is usually completed by the customer. The acceptance test ensures the system is ready to be put into production. Any of the four types of testing can be used during system development and/or maintenance.

Standards also exist regarding test documentation. According to A Standard for Auditing Computer Applications (William E. Perry), if testing is properly performed, a test plan, test results, and a test report should be available. In addition, The Complete Guide to Software Testing (William Hetzel) defines critical control elements to be a test plan, a record of testing, and a record of test results. A test plan provides an opportunity for independent review and approval of proposed testing. Documentation of test activities enables management to monitor project progress. It also provides supervisors a means for reviewing and approving staff work. Management can use test results to analyze system capabilities and deficiencies, and determine if a system or system change is ready for
implementation. Test results also provide user management with information needed to determine whether to accept, modify, or reject a system or system change.

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**ASB Testing Policy**

ASB’s current policy is general regarding testing. However, policy does require a test plan, a log of testing activity, and a record of test results. ASB has developed draft policy on testing which provides more detail on required documentation.

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**OTD Testing Policy**

OTD’s current policy states "...in order to ensure the reliability of all production systems, test plans must be formulated for newly developed systems and for all modifications to existing systems." Department policy requires development of a general test plan followed by development of a detailed test plan when developing a new system. Policy also requires development of a maintenance test plan for all system maintenance and enhancements. According to policy, test plans must be comprehensive enough to ensure a system is working properly. The development test plan should include unit testing, system testing, and acceptance testing. The maintenance test plan should include a list of programs and/or procedures to be tested, anticipated results, and a date indicating when anticipated results were achieved. Policy requires completed test plans to be reviewed by the bureau chief to ensure all steps were followed and all anticipated results were achieved.

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**DOLI Testing Policy**

DOLI’s current policy requires a request for programming (RFP) file folder for each request received. All documentation for each request is maintained in the RFP file. The RFP file must contain, among other items, a test plan, test data, and test results. Policy requires ongoing development of a test plan, careful selection of test data, and documentation of test results. DOLI policy requires similar documentation during system maintenance.
Testing Policies Not Followed

Our review indicates noncompliance with current testing policies in all three agencies. At ASB, we found the Regents' Employee Reporting System (RERS) has no documentation related to testing, no test plan, test scripts, or test results. Test scripts are being maintained for the Public Employees' Retirement Division New Active System, but a test plan had not been developed as of our review.

For OTD, the Internal Mainframe Systems Bureau just completed a rewrite of the Low Income Energy Assistance Program (LIEAP) System. A major rewrite of the Medicaid Paid Claims System was also completed in April 1991. The Microcomputer Applications Bureau is currently rewriting the Client Database and downsizing the system from the mainframe to the microcomputer environment. No documentation related to testing was observed for these systems; no test plans or test results. Limited documentation of user testing was observed for these systems. Of 52 total maintenance requests reviewed, only 1 request had documentation related to testing. The Client Database rewrite project is still in the early stages of development; however, at the time of our audit, project schedules did not require test results. OTD's new system development life cycle now requires test plans and test results.

Within DOLI, staff completed a project replacing local job service office IBM 8100 equipment and systems and consolidating all offices onto the state's mainframe computer. Staff also implemented a Safety Licensing System for the Research, Safety, and Training Division. No documentation related to testing was observed for either of these systems; no test plans, test data, or test results. We did observe documentation related to acceptance testing for these systems. In addition, we reviewed maintenance documentation for the Eagle System and the Benefits and Tax systems. Of the 30 total requests reviewed, 12 did not have a test plan. Test data and test results were observed for all but 1 of the 30 requests.

Although it appears staff within these three agencies conduct some testing during system development and maintenance,
appropriate documentation of testing is not formally maintained. Staff keep some personal files of test documentation like screen printouts, source code listings, and test data during unit testing for some systems, but formal documentation is not always kept as part of system documentation. Due to the lack of appropriate test documentation, there is no assurance required testing was completed.

All areas critical to a system may not be tested if test plans are not developed, reviewed, and approved. The system design may not be followed and system specifications may not be met. Insufficient testing decreases possibilities for identifying system errors and deficiencies. Testing will never achieve 100 percent confidence, but failure to adequately test significant system components could create problems during future system operations. According to industry guidelines, correcting system errors and/or deficiencies after a system is in production is much more time consuming and costly than if done during initial development.

If test documentation is not maintained and reviewed, management cannot properly evaluate system and staff performance. Without documentation of test results, management also cannot adequately determine whether a system or system change is ready for implementation.

Several factors contribute to the lack of test documentation. Guidelines on test documentation content and retention, and testing procedures are not specific. Management has no formal process for reviewing test documentation to determine compliance with standards. Finally, although staff and management appear to recognize the importance of testing, the importance of developing test plans and need for documentation of testing is not emphasized by management.

Management should enforce its own testing requirements to ensure new systems and revisions function properly. Management should also enforce its own documentation requirements related to the planned approach, and the extent and results of
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testing. Documentation should include details of planned testing as well as a summary of test results.

ASB plans to review its policies and procedures and more clearly define requirements. OTD management stated they do not formally approve test documentation due to limited personnel resources. OTD plans to implement a change control document which will be used by staff to document testing performed. DOLI sees room for improvement in documenting system testing and believes it can do a better job of enforcing policies.

**Recommendation #5**

We recommend the Application Services Bureau, the Operations and Technology Division, and the Department of Labor and Industry:

A. Develop more specific guidelines on testing procedures and test documentation content and retention.

B. Enforce system testing and test documentation requirements.

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**System Documentation**

System documentation is critical for development and maintenance of automated systems. Management, programmers, and customers need documentation to aid communications and refer to during the life of a system. Documentation helps reveal system weaknesses and in doing so improves effectiveness. Accuracy and efficiency of measuring project progress and success will improve with quality documentation. Without documentation, anyone involved with a system must rely on memory. System documentation can also be used to help train new staff members, both programmer/analysts and system users.

As part of our audit, we compared standards of the three departments to industry standards to determine the appropriateness of
current system documentation standards. We also reviewed
documentation for several systems developed and/or maintained
by each of the agencies to determine compliance with depart-
ment standards. Current documentation standards of each
department are comparable to industry standards. However, we
found established policies and procedures are not followed.

According to ASB's technical guide, documentation of prelimi-
nary analysis will include project scope and objectives, business
needs, system requirements, cost/benefit, a recommendation on
how to proceed, and preliminary plans for the remainder of the
project. The guide refers to documentation for the second phase
of system development including technical documentation,
system software, a test plan, and a plan for training. ASB
standards require formal concurrence from the customer that the
project meets the scope and objectives. Finally, ASB's guide
requires periodic informal internal audits.

ASB standards also provide general guidelines for staff to follow
when conducting system maintenance. Tasks which may be
performed parallel system development procedures. One of the
intended objectives is to assist in maintaining the quality of an
existing system by applying appropriate design methods to each
task and by maintaining documentation.

ASB guidelines indicate a customer's signature should always be
obtained on the form used to request support services. Guide-
lines detail tasks to perform when providing system support.
These include preparing and updating documentation. Guide-
lines require all production software to have a program change
log within the source code identifying the service request form
number, date, and person completing the change(s). In addition,
documentation requirements include a listing from COMPAREX
software comparing the new version of a program to the old
version.
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System Documentation Required for OTD

OTD policy states procedures and standards are to be strictly followed by all department personnel. The standards manual describes the purposes, tasks, staffing needs, and products (deliverables) for each phase of the development methodology. Policy also requires a post-implementation review after a system has been in production for at least six months. According to standards, each system must be sufficiently documented to allow maintenance or modification without the assistance of individuals involved in the original development.

OTD's current development documentation standards require various types of system and technical documentation. New draft policy also mandates additional types of documentation. Required documentation includes system narratives, flowcharts, program definitions, a statement of need or initial problem statement, a functional requirements document, a finalized cost benefit statement, program documentation, and an implementation plan and schedule.

OTD's standards manual provides a general guideline for staff to follow when conducting system support. Any modifications to systems must adhere to the same standards and procedures used for system development. Procedures describe the process staff should follow when completing system modifications including required documentation. For each program modification, standards require programs to contain the programmers name, a date, the change request number, and a description of the change made.

System Documentation Required for DOLI

Current DOLI standards require documentation of automated information systems so the system description remains current and accurate. Department manuals describe the mission, standards, and documentation required for system development and maintenance.

DOLI's current documentation standards require source code documentation, a documentation checklist, a general system overview, technical documentation, and minimum RFP file
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folder requirements. RFP file requirements include the RFP form, project scope and objectives, time and cost estimations, input and output views, test documentation, and other pertinent documents.

Systems Reviewed

We reviewed development documentation for the following systems at ASB: RERS (Regent's Employee Reporting System), and the Public Employees' Retirement Division (PERD) New Active System. We also reviewed maintenance documentation for RERS and the State Trust Land Management System.

We reviewed system development documentation for the following three internally developed and maintained systems at OTD: the Low Income Energy Assistance Program (LIEAP) System, the Medicaid Paid Claims System, and the Client Database. We also reviewed maintenance documentation for the LIEAP and Medicaid Paid Claims systems.

Finally, we reviewed system development documentation for the following two systems at DOLI: the 8100 Project, and the Safety Licensing System. We also reviewed maintenance documentation for the EAGLE System and the Benefits and Tax systems.

Not All Required Documentation Maintained

It does not appear all required system documentation is maintained for system development and maintenance projects. In addition, documentation is not consistent between projects. The general system development life cycle is followed, but specific requirements followed depend on the people involved with the project.

Our review of systems shows that technical documentation appears to be kept during system development. However, system documentation is not consistent. Aside from technical aspects, documentation varies from project to project. There are differences even in how system documentation is organized. Notes, letters, and memos are inconsistent in format, content, and retention. System documentation is also not formally reviewed for compliance with department standards.
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There was no documentation of formal acceptance of RERS. For RERS and the PERD New Active System, only one memo noted management approval of development. For RERS, 4 of 22 service request forms lacked formal approval. Several changes were not indicated in RERS source code documentation. Finally, 12 of 41 forms did not have documented management approval. Forms also have no indication of management review.

Management approval was obtained for the first phase of development of the Client Database project. In addition, all service request forms were signed by both data processing and user management. However, there were no cost/time estimations or target dates for 8 of 40 Medicaid Paid Claims system changes. In addition, 7 of 40 changes were not indicated in Medicaid Paid Claims source code documentation.

Formal management approval was not observed for either the 8100 Project or the Safety Licensing System. Only 1 of the 30 maintenance requests reviewed had formal management approval. There were no project scope and objectives for 5 of the 30 total RFP files reviewed. We also reviewed the program change log for the EAGLE System and found 5 of 20 changes were not indicated in source code documentation.

Lack of documentation is a common problem associated with development and maintenance of automated systems. According to industry experience and agency staff, system documentation is typically completed after the system and/or change is operational. Users drive the process and are more interested in an operational system than adequate documentation. As a result, system documentation is given a low priority. According to management, lack of resources and time causes system documentation to suffer.

Inconsistency and/or lack of documentation can create problems and inefficiencies in operations. Inconsistent documentation can cause time delays when staff switch from one project to another. Lack of documentation can increase problems and costs associated with system operation. Without complete documentation, system changes became more difficult. Staff have limited
knowledge of system design and operation. This can create additional problems when system changes are completed which unknowingly affect other areas of the system.

Although current documentation standards at the three agencies appear to provide a basis for developing and maintaining quality systems, current system documentation standards are not followed and documentation is not completed consistently between projects. Management should emphasize the importance of system documentation to the overall project. In addition, management should ensure complete documentation exists, as appropriate, for all system development and maintenance projects.

Management at ASB will review policies with the intent of more consistently maintaining documentation from project to project. OTD policies and procedures are being reviewed and modified to reflect current operations. In addition, OTD established a documentation system in 1992 to provide more uniform documentation. DOLI management encourages staff to tailor procedures depending on project size, scope, and need. DOLI management will clarify this authority with written guidelines.

**Recommendation #6**

We recommend the Application Services Bureau, Operations and Technology Division, and the Department of Labor and Industry:

A. Emphasize the importance of system documentation.

B. Ensure complete documentation exists for all system development and maintenance projects.
ASB management uses the project control software package PC/70 to monitor system development and maintenance projects. A LOTUS spreadsheet is used to estimate project costs. Personnel at ASB recently conducted a review of project management software and purchased a package to aid in project management. Based on our review, it appears this new software package could help strengthen management information at ASB.

Neither OTD nor DOLI have management information systems to monitor system development and maintenance. Several project management tools are available to staff at OTD and DOLI, including Microsoft Project, but are not used consistently for project monitoring.

Various reports tracking work requests, staff time, estimated costs, and project status are compiled by each department. Some quarterly reports are also generated. Other management information is kept informally or generated as needed. Management at OTD and DOLI do not formally track actual costs or time frames and compare them with project estimations.

Accurate, timely, and appropriate management information is essential for providing effective control. A successful project relies on sound management of staff and project activities. Controls, including management information, must be in place to enable management to evaluate progress and make necessary corrections. Industry standards suggest collection and analysis of numerous types of management information as part of project control. System development and maintenance, operations, and personnel are main areas of concentration.

If management information is inaccurate or appropriate information is not collected, program operations could suffer. Lack of management information could cause management to make uninformed decisions which negatively affect staff and/or the quality of systems.
ASB management is aware of insufficiencies with project cost estimation and planning, and recently purchased a new project management software system. However, ASB management does not measure bureau performance or compare bureau results to established goals and objectives. It appears OTD and DOLI management compile some project statistics, but it does not appear management evaluates project activities and costs to identify concerns.

There is no formal process in place for evaluating performance in completing work requests on time. Management information relates specifically to number of work requests and project status. Management does not analyze time or costs associated with system development and maintenance.

Management at these agencies should gather information for use in measuring system and staff productivity. Project estimations such as costs and time-lines should be compared to actual results to determine accuracy. Other types of information should also be collected and analyzed to help determine both system and staff productivity.

Management should review the usefulness of current information available to it. Current project management software should be reviewed for adequacy of monitoring projects and generating management information. Once reviewed, necessary action should be taken to ensure adequate information is available to make informed decisions. These actions will help improve project and staff management.

Management at ASB agrees with our recommendations and plans to purchase two additional "modules" for its new project management software system. OTD management recently developed a project time reporting system to help gather information. In addition, OTD management has started to analyze requirements for management information and plans to further develop its management information system as department priorities allow. DOLI management also agrees with our recommendations and plans to continue to develop and implement new ideas for its management information system.
**Recommendation #7**

We recommend the Application Services Bureau, the Operations and Technology Division, and the Department of Labor and Industry:

A. Analyze the usefulness of current management information for project and staff management.

B. Develop a project management system which collects and maintains appropriate management information needed for use in directing and evaluating performance.

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**Performance Appraisals**

During our audit we examined employee personnel files to determine whether performance appraisals are completed in accordance with the Administrative Rules of Montana (ARM). Performance appraisals are completed at ASB. We found only one of eight OTD personnel files reviewed had a current performance appraisal. Three OTD files reviewed had no performance appraisals, although two of the three files had completed pre-appraisals. We found four of eight Department of Labor and Industry (DOLI) personnel files reviewed did not have a current performance appraisal. All four DOLI personnel files lacking performance appraisals were management positions.

Section 2.21.6411, ARM, states performance appraisals are to be completed for each full-time and part-time position during established appraisal periods of not more than one year’s duration. Appraisals provide direction and motivation for employees. Areas requiring corrective action or additional training can be identified during the appraisal process.

Failure to complete periodic performance appraisals makes it difficult for management to monitor and document employee productivity and program effectiveness. Lack of performance appraisals also limits department management’s ability to ensure
program intent is met. Without performance appraisals, staff may not receive information on productivity which could negatively affect morale. A performance appraisal system could help management identify and correct potential inadequacies.

It appears department administration placed a low priority on completion of performance appraisals. As a result, department management has not placed emphasis on completion of annual evaluations.

Department management should complete timely appraisals of all staff. Periodic appraisals will increase department management's ability to evaluate employee performance. An appraisal system will provide employees with formal recognition for productive activity and help identify areas for improvement.

Performance appraisals are not a priority at OTD. OTD management believes time spent on appraisals cannot be recovered through increased employee efficiency. The Commissioner of the Department of Labor and Industry believes in the performance appraisal process and has taken action to update and standardize a performance appraisal system.

**Recommendation #8**

We recommend the Operations and Technology Division, and the Department of Labor and Industry implement formal procedures for completing timely performance appraisals of all staff.

**System Development and Maintenance Standards**

Management activities involve planning, organizing, directing, and controlling. Established standards (policies and procedures) provide general controls over system development and maintenance activity. Controls direct data processing staff on procedures which must be followed when developing new systems and/or changing existing systems. Controls also strengthen
management's control over program operations and help assure continuity of services as staffing changes occur.

No Formal Process - OTD

Standards must be carefully planned and continually monitored to ensure effective implementation. One responsibility of management is to monitor the performance of program activities. Management must determine whether controls function properly. Monitoring standards will enable management to detect and correct deficiencies in order to improve program operations, including system development and maintenance procedures.

OTD management has no formal process for reviewing and updating standards. According to management, standards are only updated every so often, maybe every five years. Staff are given opportunity to make suggestions and recommend changes, but there is no formal process.

Although OTD's standards manual was updated in June 1991, certain sections are still outdated. For example, system development procedures refer to the SRS Policy Committee which is obsolete. Project control procedures are referred to in system support procedures but have not been established. In addition, draft policy was recently developed and has some variances from current procedures relating to the development methodology and required documentation. We believe new draft policy is inadequate because it requires less deliverables than industry standards and current OTD policy.

No Formal Process - DOLI

DOLI also has no formal process for reviewing and updating system development and maintenance standards. The Job Service Division has not formally established microcomputer standards, but staff indicate industry standards will be used as a base. The Unemployment Insurance Division also has not established formal guidelines due to the diversity of its projects. Centralized Services Division staff will follow standards developed by the now defunct Office of Information Services (OIS). In addition, staff decentralized from OIS to the Job
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Service and Unemployment Insurance divisions will continue to follow OIS standards.

Standards can become outdated quickly in the data processing field. Lack of formal and up-to-date standards can cause inconsistencies in operations and impede staff performance. Without a formal standards monitoring process, the status of system development and maintenance functions may not be known. Staff also may not be developing and maintaining systems in the most efficient and effective manner. If potential problems are not identified, staff will continue to follow improper procedures. The longer problems exist, the more severe the results.

Historically, agencies only establish department-wide guidelines for issues which are common to all department personnel. General data processing functions are usually covered under department policy. Specific standards are usually left up to each individual program. Management believes operations are functioning properly and current standards are sufficient to meet needs. However, our review indicates need for more specific direction from department management regarding system development and maintenance standards.

Due to short time lapses between data processing industry changes, department management needs to formalize a process to review and update standards on a regular basis. Management must implement a process to periodically review standards. This will help ensure system development and maintenance standards are kept up-to-date. It should also increase consistency between divisions and increase the possibility of data processing staff participating in other division projects.

OTD management is currently developing a new system development life cycle and plans to revise standards after the new methodology has been finalized. In addition, OTD management plans to establish a process for updating standards. The Department of Labor and Industry also agrees with our recommendations. As mentioned in Chapter V, DOLI plans to create a core group consisting of information technology managers from divisions responsible for system development and maintenance.
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This core group will be responsible for ensuring communication between divisions remains open and system development and maintenance standards are consistent department-wide.

**Recommendation #9**

We recommend the Operations and Technology Division, and the Department of Labor and Industry establish a formal process for monitoring and periodically updating system development and maintenance standards.
Chapter VII
Summary

Methodologies are in Place

This audit focused on system development and maintenance activities within three agencies. Overall, we found each of the operations reviewed have both system development and system maintenance methodologies in place. This provides a base for development and maintenance of automated systems. The methodologies established within each of the departments are generally comparable to industry standards. Users of the systems we reviewed indicated overall satisfaction with processes used by the three agencies.

Methodologies are not Always Followed

While we found areas where system development and maintenance activities were operating as documented and described to us, we also found areas where the methodologies are not followed. We noted some common concerns with various aspects of system development and maintenance activities. These include:

-- system testing and test documentation.
-- system documentation.
-- system development and maintenance standards.

The potential effects resulting from these concerns are twofold. First, systems may not be as cost effective as possible. Secondly, system deficiencies may not be identified.

Improved Management Controls Needed

During our review, we also identified the following management controls which could be improved:

-- management information.
-- performance appraisals.

Improvements in management controls will provide increased assurance to management and the state that automated systems are developed and maintained effectively.

Formal system development and maintenance methodologies provide check-points for management and staff to measure progress and success. We believe implementation of our
recommendations will increase the effectiveness of departmental operations. In addition, implementation will provide department management and the state with increased assurance that automated systems are developed and maintained in the most efficient and economic manner possible.
November 19, 1993

Jim Pellegrini
Deputy Legislative Auditor
Office of Legislative Auditor
Room 135, State Capitol
Helena, MT  59620

Dear Jim:

The department’s response to the October, 1993 Performance Audit Report of Automated System Development and Maintenance is as follows:

RECOMMENDATION #1

WE RECOMMEND THE APPLICATION SERVICES BUREAU IMPLEMENT POST-IMPLEMENTATION REVIEW AS PART OF ITS METHODOLOGY TO ENSURE SYSTEM REQUIREMENTS ARE MET AND TO EVALUATE CUSTOMER SATISFACTION.

Response

The department concurs with this recommendation. ASB will include a post-implementation review task as part of its methodology.

Scheduled Implementation Date: 03/01/94

RECOMMENDATION #2

N/A

RECOMMENDATION #3

N/A

RECOMMENDATION #4

WE RECOMMEND THE APPLICATION SERVICES BUREAU, THE OPERATIONS AND TECHNOLOGY DIVISION, AND THE DEPARTMENT OF LABOR AND INDUSTRY INCORPORATE MONTANA OPERATIONS MANUAL POLICY REGARDING COORDINATION AND INFORMATION SHARING INTO CURRENT SYSTEM DEVELOPMENT METHODOLOGIES.
Response

The department concurs with this recommendation. ASB will include in its design methodology a task to insure interdepartmental sharing has been considered for each project and the customer agency has been encouraged to communicate its plans with other state agencies through ITMG and ITAC.

Scheduled Implementation Date: 03/01/94

RECOMMENDATION #5

WE RECOMMEND THE APPLICATION SERVICES BUREAU, THE OPERATIONS AND TECHNOLOGY DIVISION, AND THE DEPARTMENT OF LABOR AND INDUSTRY:

A. DEVELOP MORE SPECIFIC GUIDELINES ON TESTING PROCEDURES AND TEST DOCUMENTATION CONTENT AND RETENTION.

B. ENFORCE SYSTEM TESTING AND TEST DOCUMENTATION REQUIREMENTS.

Response

The department concurs with this recommendation. ASB will review all of its policies and practices on testing and test documentation with the intent of more clearly defining testing requirements. The objective of this review will be to define a model set of testing requirements that will be tailored to each project. To the extent required by the results of this review, ASB will enforce testing and test documentation requirements.

Scheduled Implementation Date: 09/01/94

RECOMMENDATION #6

WE RECOMMEND THE APPLICATION SERVICES BUREAU, OPERATIONS AND TECHNOLOGY DIVISION, AND THE DEPARTMENT OF LABOR AND INDUSTRY:

A. EMPHASIZE THE IMPORTANCE OF SYSTEM DOCUMENTATION.

B. ENSURE COMPLETE DOCUMENTATION EXISTS FOR ALL SYSTEM DEVELOPMENT AND MAINTENANCE PROJECTS.

Response

The department concurs with this recommendation. ASB will review all of its policies and practices on technical documentation with the intent of clarifying the importance of system documentation in ASB’s work methods, training, and written procedures that identify documentation requirements.

ASB will also establish procedures that ensure system documentation requirements are being met by the bureau.
Scheduled Implementation Date: 05/01/94

RECOMMENDATION #7

WE RECOMMEND THE APPLICATION SERVICES BUREAU, THE OPERATIONS AND TECHNOLOGY DIVISION, AND THE DEPARTMENT OF LABOR AND INDUSTRY:

A. ANALYZE THE USEFULNESS OF CURRENT MANAGEMENT INFORMATION FOR PROJECT AND STAFF MANAGEMENT.

B. DEVELOP A PROJECT MANAGEMENT SYSTEM WHICH COLLECTS AND MAINTAINS APPROPRIATE MANAGEMENT INFORMATION NEEDED FOR USE IN DIRECTING AND EVALUATING PERFORMANCE.

Response

The department concurs with this recommendation. Specifically:

1) Two additional "modules" of the Project Workbench software have been acquired and are being incorporated into ASB's work methods as part of the ongoing effort to improve the process of collecting and evaluating project management information.

2) The current practice of using PC/70, Project Workbench, and other management tools will be reviewed to determine their usefulness. The review will also determine whether or not current practices should be augmented with a process for identifying summary data that will become a regular part of management information.

Scheduled Implementation Date: 07/01/94

RECOMMENDATION #8

N/A

RECOMMENDATION #9

N/A

Sincerely,

Lois Menzies
Director

cc: Mike Trevor, Administrator, Information Services Division
    Jeff Brandt, Chief, Application Services Bureau
    Sharon Gorie, Supervisor, Computing Policy and Development
November 18, 1993

Jim Pellegrini
Deputy Legislative Auditor
Performance Audit
Office of Legislative Auditor
State Capitol
Helena, MT 59620

Dear Mr. Pellegrini:

Enclosed is the Department response to the Performance Audit Report of October, 1993 on Automated System Development and Maintenance. Most of our concerns and corrective actions were included in the final report. The enclosure completes our response and needs to be added to the report.

Please contact me if you have any questions.

Sincerely,

Michael G. Billings
Administrator
Operations and Technology Division

enc.
The following is the Department of Social and Rehabilitation Services (SRS) response to the Legislative Auditors Performance Audit Report on Automated System Development and Maintenance for the Department of Administration, Department of SRS and Department of Labor and Industry.

Chapter IV - Department of SRS

Legislative Auditors Recommendation #2

We recommend the Operations and Technology Division:

A. Analyze staff training needs.

B. Implement a training program to meet identified needs.

SRS Response

The Department concurs with the recommendation and is implementing a training program as indicated in the Performance Audit Report.

Chapter VI - Common Concerns

Legislative Auditors Recommendation #4

We recommend the Applications Services Bureau, the Operations and Technology Division and the Department of Labor and Industry incorporate Montana Operations Manual policy regarding coordination and information sharing into current system development methodologies.

SRS Response

The Department concurs with the recommendation. SRS will continue to share and coordinate information system technology with other Departments. SRS is assisting the Department of Family Services in development of new information systems while supporting current shared information systems. The development of TEAMS and SEARCHS was coordinated with the Department of Administration. The Department has developed and shared with other departments criteria for access to automated databases.
Legislative Auditors Recommendation #5

We recommend the Application Services Bureau, the Operations and Technology Division and the Department of Labor and Industry:

A. Develop more specific guidelines on testing procedures and test documentation content and retention.

B. Enforce system testing and test documentation requirements.

SRS Response

The Department concurs with the recommendation. The SRS Information Systems Development Methodology, adopted September 1, 1993, requires a test plan and retention of test results for systems development and maintenance. The Department will enforce this methodology including the testing provisions.

Legislative Auditors Recommendation #6

We recommend the Application Services Bureau, Operations and Technology Division and the Department of Labor and Industry:

A. Emphasize the importance of system documentation.

B. Ensure complete documentation exists for all system development and maintenance projects.

SRS Response

The Department concurs with the recommendation. The SRS Information Systems Development Methodology identifies documentation requirements for system development and maintenance.

Legislative Auditors Recommendation #7

We recommend the Application Services Bureau, the Operations and Technology Division and the Department of Labor and Industry:

A. Analyze the usefulness of current management information for project and staff management.

B. Develop a project management system which collects and maintains appropriate management information needed for use in directing and evaluating performance.

SRS Response

The Department concurs with the recommendation and is developing a project management information system as indicated in the Performance Audit Report.
Legislative Auditors Recommendation #8

We recommend the Operations and Technology Division and the Department of Labor and Industry implement formal procedures for completing timely performance appraisals of all staff.

SRS Response

The Department concurs with the recommendation. Operations and Technology Division management will emphasize implementation of existing SRS policies on formal performance appraisals in accordance with the Administrative Rules of Montana.

Legislative Auditors Recommendation #9

We recommend the Operations and Technology Division and the Department of Labor and Industry establish a formal process for monitoring and periodically updating system development and maintenance standards.

SRS Response

The Department concurs with the recommendation. An Operations and Technology Division committee has been appointed and is meeting to review information systems standards.
November 19, 1993

Scott A. Seacat
Legislative Auditor
Office of the Legislative Auditor
State Capitol
Helena, MT  59620

Dear Scott:

Attached is our response to your final report on the audit of the state automated system development and maintenance. Copies of the audit report you provided to us are also enclosed.

We appreciate the cooperation of your staff in taking the time to review the audit findings with us in detail. The report is very helpful.

The department administrators and I will be happy to continue working with you and the Legislative Audit Committee to answer questions about the audit and our response.

Thanks again.

Sincerely,

LAURIE EKANGER
Commissioner

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enclosures
Prelude: The Department of Labor and Industry (DLI) recognized there were improvements to be made in the Department's Information Services and in computer programs systems development. A task group was formed to survey and analyze the situation. The comprehensive Report to the Commissioner Concerning Information Services, dated June 7, 1993 described the situation and outlined a solution strategy of decentralizing certain information services and retaining other information services in a centralized arena (the Information Services Bureau of the Centralized Services Division). A second part of the solution was to form a DLI Information Technology Managers Group (composed of technical managers representing each division) which advises the Administrators and Commissioner on IT issues.

Recommendation #3
--We recommend that DLI assign direction and control of data processing activity to one entity within the Department.

DLI has designated ISB, using the input and expertise of the Department IT manager's group, to perform the function of coordinating data processing activity in DLI. The ISB Bureau Chief is the facilitator of this group and coordinates the recommendations to assure direction established by the Commissioner and Administrators is followed.

Recommendation #4
--We recommend the Application Services Bureau, the Operations and Technology Division, and the Department of Labor and Industry incorporate Montana Operations Manual policy regarding coordination and information sharing into current system development methodologies.

DLI agrees. The Montana State Information Technology Management Group (ITMG) has, in the July 14, 1993 charter, this item as one of the main purposes for the group. The Auditor's concern is that the function is not being carried out; DLI will request a discussion of this item during the December ITMG meeting.

Recommendation #5
--We recommend the Application Services Bureau, the Operations and Technology Division, and the Department of Labor and Industry:
A. Develop more specific guidelines on testing procedures and test documentation content and retention.
B. Enforce system testing and test documentation requirements.

DLI agrees. DLI has guidelines on testing and on test documentation, but those guidelines are generic, mainframe-oriented, and somewhat old. Also, compliance with those guidelines
is inconsistent. The DLI IT Managers Group will rewrite those guidelines and forward them to the Auditor's office. The DLI IT Managers Group will be responsible for the implementation of the revised policy in their respective areas. The DLI Administrators will enforce this policy in their respective areas. Followup and monitoring will be done by ISB Chief.

Recommendation #6
--We recommend the Application Services Bureau, the Operations and Technology Division, and the Department of Labor and Industry:
A. Emphasize the importance of system documentation.
B. Ensure complete documentation exists for all system development and maintenance projects.

DLI agrees. DLI recognizes the importance of system documentation for all projects. The DLI IT managers will be responsible for ensuring that all systems have complete documentation. The DLI Administrators will enforce this policy in their respective areas. Followup and monitoring will be done by ISB Chief.

Recommendation #7
--We recommend the Application Services Bureau, the Operations and Technology Division, and the Department of Labor and Industry:
A. Analyze the usefulness of current management information for project and staff management.
B. Develop a project management system which collects and maintains appropriate management information needed for use in directing and evaluating performance.

DLI agrees. First, DLI will have a task force study the usefulness of current project management information. The results of that study will be given to ISB and the IT managers, who will be tasked with developing an appropriate project management system. We further request the Auditor's assistance in identifying an existing system which will automatically collect this data for all platforms, rather than developing home made systems for this function.

Recommendation #8
--We recommend the Operations and Technology Division and the Department of Labor and Industry implement formal procedures for completing timely performance appraisals of all staff.

DLI agrees. The Department has a policy in place regarding this. Furthermore, all administrators now have performance objectives in place which require that position descriptions and performance appraisals be in place and updated annually for all staff.
Recommendation #9

--We recommend the Operations and Technology Division and the Department of Labor and Industry establish a formal process for monitoring and periodically updating system development and maintenance standards.

DLI agrees. The DLI IT Managers Group will establish a formal process for monitoring and updating systems standards. The DLI Administrators will oversee this process. The ISB Chief will coordinate and ensure follow up.