REPORT BY THE STATE AUDITOR

OF CALIFORNIA

THE DEPARTMENT OF MOTOR VEHICLES AND THE OFFICE OF INFORMATION TECHNOLOGY DID NOT MINIMIZE THE STATE'S FINANCIAL RISK IN THE DATABASE REDEVELOPMENT PROJECT

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The Department of Motor Vehicles and the
Office of Information Technology Did Not
Minimize the State's Financial Risk In
the Database Redevelopment Project

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California State Auditor
Bureau of State Audits

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Background

Over the years, the Department of Motor Vehicles (DMV) has developed very large and complex databases to support its activities. More than a million transactions are processed by the DMV database system every day. The current databases and their application software programs were developed in the 1960s. Thus, the basic technology of the databases is 30 years old, and it has become increasingly difficult to maintain these old systems. As a result, the DMV determined that it was necessary to modernize their databases.

The Database Redevelopment (DBR) project was initiated in 1987 to redesign the DMV's systems and databases to meet all existing requirements and functions, structure the system to be more responsive to future changes, and improve the efficiency of electronic data processing services. The DBR project was intended to provide a variety of improvements to the system that would allow the DMV to improve service levels and move into the future. In addition to addressing technical concerns, the DMV intended the DBR to address certain strategic objectives. These objectives were prompted by legislative mandates and proposals that would require the DMV to cross-match information in their various databases, a capability it did not have at that time.

Results in Brief

During our comprehensive audit of the DMV's DBR project, we found that the DMV continued its effort to fully implement the project despite significant unresolved problems and deficiencies, which led to the ultimate failure of the project in 1994. Further, our audit revealed that the Office of Information Technology (OIT), the State's information technology oversight body, continued to recommend additional funding for the project despite the fact that the DMV had not followed approved policies to minimize financial risk to the State. Additionally, we found that the DMV's actual and obligated costs were $5.1 million higher for the project than originally reported to the Legislature and the Department of Finance, and that the DMV violated numerous contracting laws and regulations, including falsifying a purchase order for approximately $46,000. Specifically, we noted the following:

- The DMV progressed beyond the developmental stages of the DBR—the operational assessment and the working model—even though it had failed to accomplish the objectives of each stage and had not resolved significant technical problems encountered during the development process. In its unsuccessful attempt to implement the DBR, the DMV spent an additional $34.6 million. Rather than complete each stage as planned, the DMV substantially modified the stages or failed to complete them altogether.

- Initially, the DMV established a meaningful set of development objectives for an operational assessment and working model of the project. Each of these objectives was supposed to be accomplished before proceeding with the project and incurring additional expenses. However, the DMV continued to develop the system and incur expenses without first solving technical and performance problems that arose.

- The OIT continued to recommend additional funding for the DBR project, thus allowing the DMV to attempt to put the DBR project into operation, even though it knew the DMV had not successfully developed a working model of the project as the OIT had previously required before the DMV could proceed with the project.

- The DMV did not use a formal cost-reporting system to monitor expenditures related to the DBR project. The DMV's actual and obligated costs for the project were at least $49.4 million, which is $5.1 million more than the $44.3 million in project costs that the DMV originally reported to the Legislature and the Department of Finance.

- The DMV falsified a software purchase order for approximately $46,000 to pay for consulting services that Tandem Computers, Inc. had provided through the use of subcontractors. Approximately $28,000 was for services provided before the DMV awarded Tandem a contract, and approximately $18,000 was for services that Tandem provided during the contract period, but for which sufficient funds did not exist under the contract to pay for the services. Although the DMV paid an invoice which indicated the software was received, no software products were ever delivered.

- The DMV did not always adequately justify its use of sole-source consulting contracts for the DBR project. Specifically, of the four sole-source consulting contracts into which the DMV entered for the DBR project, the DMV did not adequately justify three, entered into from November 1987 to July 1990 and totaling $2.8 million.

Additionally, the Department of General Services (DGS) approved the contracts even though the DMV had not provided adequate justification.

- From November 1987 to November 1991, the DMV allowed contractors to begin work before the DGS approved the contracts or contract amendments. In addition, the DMV significantly modified one contract without obtaining DGS' approval.

These problems occurred because the project's management desired to keep the project on schedule, incorrectly believed that the technical problems could be resolved, and incorrectly asserted that critical developmental objectives had been achieved. In addition, the situation was allowed to continue because the DMV management failed to establish an effective quality assurance process that would provide an independent assessment of progress and because management did not satisfactorily react when they were ultimately informed by the project's management team that problems existed.

Furthermore, the OIT did not exercise its authority to insist that the DMV accomplish the working model before recommending continued funding.

Recommendations

Department of Motor Vehicles

To ensure that the DMV does not unnecessarily incur costs of this magnitude in the future, the DMV should complete the milestones it establishes for the development of new electronic data processing (EDP) systems; conduct sufficient testing and analysis to determine that proposed EDP projects will achieve their projected benefits, both monetary and programmatic; and ensure that technical problems identified during quality assurance reviews of EDP projects are resolved before continuing to devote resources to those projects.

To ensure that the DMV maintains and reports accurate cost records of EDP projects, it should implement a standard cost reporting system for all EDP projects. In addition, the DMV should obtain approval from the Department of Finance if it expects to deviate by more than 10 percent from its approved level of funding for EDP projects.

To ensure that the DMV adequately protects the State's financial and legal interests and obtains the highest quality of services at the lowest possible price, the DMV should follow all contracting laws and regulations when awarding contracts. Further, it should consider taking disciplinary action against the employees involved in falsifying the purchase order.

Office of Information Technology

To ensure that departments are following approved policies to minimize financial risk, the OIT should exercise its authority to approve proposed expenditures for electronic data processing only if established policies and procedures, which have been published and maintained in the State Administrative Manual, have been met and followed. Also, the OIT should ensure that departments accomplish the objectives and requirements included in approved feasibility study reports and special project reports before allowing projects to move forward.

Agency Comments

Department of Motor Vehicles

The DMV agrees that there were mistakes in judgment and form during the DBR project. Specifically, the DMV agrees with our conclusion that the project should have been stopped and reassessed in 1990. The DMV stated that, in general, our report provides a fair assessment of the project history. However, the DMV does not believe that we adequately recognized the revitalization efforts undertaken after 1991. The DMV also agrees that a purchase order was falsified to make payment for services rendered. However, the DMV does not agree that there were numerous incidents of contracting law and regulation violations. Finally, the DMV stated that it will immediately work to implement each of our recommendations.

Department of Finance

The Department of Finance (department) agrees that our report presents fairly the facts surrounding the DBR project. However, the department disagrees with many of the conclusions drawn from these facts. In particular, the department does not believe it violated any of its policies and procedures in recommending approval of the DMV project. Finally, the department indicated that it has implemented steps in recent years to address some of the issues we identified.

Introduction

The Department of Motor Vehicles (DMV) fulfills a variety of responsibilities, including the following:

- Protecting the public interest in vehicle and vessel ownership;

- Providing various revenue collection services for state and local agencies;

- Regulating the issuance and retention of drivers' licenses;

- Providing personal identification services to drivers and nondrivers;

- Licensing and regulating occupations and businesses related to the manufacture, transport, sale, and disposal of vehicles; and

- Licensing and regulating occupations and businesses related to driving instruction.

Over the years, the DMV has developed very large and complex databases to support its activities in fulfilling these responsibilities. For example, the driver's license database consists of more than 30 million records, and the vehicle registration database consists of more than 40 million records. More than a million on-line and batch transactions are processed by the DMV's database system every day. The transactions are distributed nearly equally among three types:

- Transactions that support DMV programs, such as vehicle registration;

- Transactions that support law enforcement activities; and

- Transactions that support DMV headquarters activities and other organizations, such as insurance companies.

The current databases and their application software programs were developed in the 1960s and were originally designed to operate on RCA computers. Since that time, the databases and their application software have been moved twice, once in 1981 to Unisys computers and once in 1989, when the DMV moved their databases and their application software to the Stephen P. Teale Data Center (data center)

and changed to IBM computers. During these moves, the databases and the software programs remained essentially the same. Thus, the basic technology of the databases is 30 years old.

It has become increasingly difficult to maintain these old systems for several reasons. First, many of the system's software programs are written in a computer language, "assembler," that is no longer widely used. Many of the system's original programmers no longer work at the DMV, and because this language is no longer widely used, it is difficult to recruit programmers familiar with it. Second, the systems have been changed so many times that making further changes requires a great deal of time and effort because the programs have unusual, redundant, and obsolete code. This problem is exacerbated by the fact that the flow of the assembler language application programs is extremely complex and convoluted; therefore, the effect of software changes on other software programs is hard to determine. Third, all of the software programs were written exclusively for the DMV; therefore, the programs are not compatible with industry-standard software programs that have been developed since the system was designed. This means that new technological advances cannot be readily implemented to improve DMV operations.

For these reasons, the DMV determined that it was necessary to modernize its databases. The Database Redevelopment (DBR) project is intended to achieve the following:

- Redesign the DMV's systems and databases to meet all existing requirements and functions;

- Structure the system to be more responsive to future changes; and

- Improve the efficiency, productivity, quality, and timeliness of electronic data processing services through the use of standard software and new system development technologies.

The DBR was intended to provide a variety of improvements to the system that would allow the DMV to improve service levels. These improvements included the following:

- Increased accuracy of records;

- Improved collection of parking fines;

- Greater capability to respond to nonroutine information requests;

- Enhanced ability to adjust to program changes;

- Improved ability to expand the databases; and

- Reduced costs to maintain the system.

Although the DBR project was initiated to address the DMV's technical concerns about the system, the DMV decided to use the database renovation as an opportunity to achieve certain strategic objectives. In some instances, these objectives exceeded the scope of the DMV's responsibilities for licensing drivers and registering vehicles. With the vision of a broadening mission in the future, the DMV identified the need for a flexible information system to adapt quickly to a changing set of mandates. This vision of a broadening mission was prompted by certain legislative mandates and proposals related to the DMV performing functions beyond licensing drivers and registering vehicles.

Legislative Mandates

Before and during the DBR project, the State Legislature has mandated or proposed various laws, the implementation of which would require changes to the DMV's computer system. Many of the laws were intended to achieve certain enforcement goals. For example, the Legislature has proposed laws that would have required the DMV to refuse to register vehicles whose owners had failed to pay traffic violation fines, been convicted of driving under the influence, or failed to satisfy a small claims judgment. The DMV opposed all the proposals because the DMV's databases did not have the capabilities required to take these actions and because changing the databases to achieve these capabilities would be expensive.

For example, the Legislature passed a law in 1984 requiring the DMV to study the feasibility of cross-matching the names of vehicle owners with the names of licensed drivers. The purpose of this cross-matching was to enable the DMV to refuse to register vehicles to uninsured drivers and uninsured vehicle owners. The conclusion of this study was that the DMV could achieve the ability to cross-match drivers to vehicle owners, with one-time costs of $8.3 million, by collecting additional information from drivers and vehicle owners and using the DMV's existing automated name index. The successful completion of the DBR project would have allowed the DMV to quickly and easily cross-match much more information than drivers' and owners' names.

In 1987, the Legislature passed a bill requiring the DMV to establish a program to cross-match the names of licensed drivers with those of registered vehicle owners. The proposed law would have authorized the DMV to recover the costs of the program through the collection of fees from the users of the resultant data. However, the governor vetoed this bill because of the significant costs and concern over the intrusion upon citizens' personal privacy.

Currently, the DMV maintains information about each of its three major activities, licensing drivers, registering vehicles, and regulating vehicle-related occupations, in three separate databases. To accommodate current and future changes proposed by the Legislature, the DMV would have to relate information contained in one database to the information contained in another database. The most significant strategic objective of the DBR was to provide the DMV with the ability to more easily cross-match data among the three databases. Cross-matching would allow the DMV to support programs that depend on relating the information contained in one database to the information contained in another database. For example, the DMV would be able to match the following kinds of information:

- Drivers to vehicles;

- Unpaid parking citations to the drivers responsible (these are currently matched to the vehicle record);

- Vehicle dealerships to the vehicles they sell; and

- Financial institutions to the vehicles they finance.

In addition, cross-matching would enable the DMV to support and enforce a mandatory insurance law.

Project Chronology

The DMV initiated the DBR project in December 1987 when the Office of Information Technology (OIT) approved the first feasibility study report (study report) that the DMV submitted. At that time, the DMV had already decided to convert its databases to IBM's DB2 relational database management system. The project schedule included in the study report stated that the DMV planned to develop and test a working model to determine the feasibility of proceeding with the project and to refine the project cost and schedule estimates. The DMV's preliminary

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estimate of the project's cost was approximately $29 million. After this analysis, the DMV planned to request OIT's approval to proceed with the project.

In July 1988, after expanding its research of relational database management systems, the DMV selected IBM's DB2 and Tandem Computers' NonStop SQL for a final comparison to determine the relational database product that best met its needs. From September 1988 to December 1988, the DMV conducted an operational assessment of the two relational database management systems. As a result of this assessment, the DMV selected the Tandem database management system.

In September 1988, the DMV requested OIT's approval to proceed with the project. At this time, the DMV stated that it planned to conduct a working model of the project. In December 1988, the OIT authorized the DMV to proceed with the working model, on the condition that the DMV not proceed with full implementation activities until the OIT approved the DMV's report on the working model's results.

Beginning in September 1988, the DMV conducted a request for proposal process that eventually procured the services of a consultant to act as co-project manager for the implementation of the driver's license, vehicle registration, and occupational licensing databases on the new database system. In addition, the request for proposal required the consultant to evaluate the working model and design and develop the new database systems using IBM's DB2 system or another system to be named later. After the bidding consultants' draft proposals were received, the DMV amended the request for proposal to substitute IBM's DB2 with Tandem Computers' NonStop SQL system. The contract was let to Arthur Young (later Ernst & Young) in June 1989. In June 1990, one year after the contract's commencement, the DMV and Ernst & Young mutually agreed to terminate this contract. Even though the DMV had contracted for co-project management in recognition of its need for project management assistance, the DMV assumed total project management responsibility for development of the entire database system after Ernst & Young left.

By June 1990, the DMV began full implementation of the system. At that time, the DMV began to hire contractors to assist with specific elements of the DBR project. Seven of the next eight consulting contracts were for work on the DBR project where tasks were assigned as needs arose. As the consultants raised additional technical

problems, the DMV as project manager had the responsibility to resolve these problems.

Because full project implementation was not progressing to the DMV's satisfaction, the DMV accepted Tandem's assistance in October 1991 to validate and, if necessary, modify the current project plan for the driver's license system. Tandem submitted its report on this review in June 1992. As a result of this review, the DMV increased the project's estimated costs from $31.4 million to $57.3 million and extended the estimated completion date from July 1995 to December 1998.

In April 1993, Tandem, in partnership with Electronic Data Systems (EDS), began assisting the DMV to develop a new project plan. The DMV and Tandem/EDS based the review of this plan on Tandem/EDS' management of the project, Tandem/EDS' management of the Tandem computer system, and Tandem/EDS' guarantee that the project be completed within a defined implementation period. In November 1993, Tandem presented its proposal for the new project plan to the DMV. Tandem estimated that the costs for finishing the implementation of the project would be $185 million—$175 million for Tandem/EDS' costs and $10 million for DMV costs. The DMV rejected this proposal and pursued the DBR project with an alternate plan.

Appendix A contains a more detailed chronology of key events related to the DBR project. Appendix B contains information about the officials responsible for the DBR project.

Scope and Methodology   We were requested to perform a comprehensive audit of the DMV's DBR project. The audit objectives included the following:

- Documenting the chronology of project events;

- Determining whether project expenditures were properly authorized by the DMV and the Department of Finance, and the extent to which the Legislature was provided appropriate opportunity for oversight;

- Determining whether the DMV complied with laws and regulations governing contract awards;

- Determining whether contractors fulfilled their obligations before the DMV paid them;

- Determining what role the data center played in the project;

- Determining whether the OIT reviewed and approved the project in accordance with state law and policy;

- Determining the length of time between identification of problems and actions taken and whether problems could have been anticipated or prevented; and

- Identifying the specific causes for the project's failure.

In addition, we were requested to determine whether any state employees or contractors associated with the project had any potential or actual conflicts of interest and if the State could recover any of the costs of equipment purchased for the project.

To document the chronology of project events, we reviewed extensive documentation related to the project contained in the files at the DMV, the OIT, and the data center. This documentation included study reports, contracts, contract amendments, personnel records, special project reports, and correspondence.

To determine whether the DMV and the Department of Finance properly authorized project expenditures, we reviewed budget documents, such as budget change proposals and special project reports. To determine the extent to which the DMV provided the Legislature with appropriate opportunity for project oversight, we identified the state laws and the DMV's internal policies related to reporting budget transfers and other project changes to the Legislature and we reviewed the DMV's compliance with these laws and policies.

To determine whether the DMV reported to the Legislature all project costs, including funds already spent and future obligations, we reviewed all supporting documentation for project costs prepared by the DMV and the data center. We did not audit these reported project costs; rather, we attempted to identify expenditures that the DMV did not include in its 1994 special project report.

To determine whether the DMV complied with laws and policies governing contract awards, we reviewed the Public Contract Code and applicable sections of the State Administrative Manual. We reviewed contracts related to the DBR project to determine if the DMV complied with the applicable laws and policies. In addition, we reviewed the related maintenance contracts and purchase orders to determine if the DMV received and paid for the deliverables. During our review of the purchase orders, we found one instance where the department falsified

a purchase order to pay a vendor for services that could not be paid from an existing contract. We are referring this matter to the Attorney General's Office for further review.

To determine if project consultants fulfilled their obligations before the DMV paid them, we reviewed the consulting contracts related to the project and the deliverables that the contractors provided to the DMV. We reviewed the contracts or the related work orders to determine if each contract specified performance prerequisites for payment. For all but one of the contracts, we judgmentally selected a sample of up to five deliverables and determined if the deliverable fulfilled the obligation specified in the contract or work order. For one contract, we reviewed all of the contract deliverables because of the unusual circumstances surrounding the contract.

To determine whether the OIT reviewed the project in accordance with state law and policy, we identified and reviewed the applicable sections of the Government Code and the State Administrative Manual. We then interviewed OIT officials and reviewed the OIT's documents and correspondence relating to the project.

To identify the causes of the project's failure, we interviewed DMV and OIT officials. We also interviewed the project's former managers and directors. However, one former project director refused to allow us to interview him. In addition, we reviewed the documented events and decisions related to the project and compared them to the project management plan the DMV had intended to follow.

Our office is currently conducting an investigation of the state employees and contractors involved in the project to determine whether they had any potential or actual conflicts of interest. In addition to our investigation, the matter has been referred to the Fair Political Practices Commission. Information related to our investigation of conflicts of interest is not available for inclusion in this report because the investigation is not complete. One of the reasons for this delay is the refusal of one of the former project directors to allow us to interview him.

Rather than unnecessarily duplicate the work of others, we intend to rely on the results of a DBR project review performed by an outside consultant to determine if the State can recover the cost of the equipment purchased for the project. The DMV has recently issued its RFP for this contract. We will monitor the consultant's work, and if we find that this area is not adequately addressed, we will perform

additional work and issue a separate report on the possibility of cost recoveries through the sale or redirection of computer equipment.

Finally, we engaged the services of two EDP consultants to assist us in our analysis of the DBR project.

Chapter 1

The Department of Motor Vehicles Should Have Stopped or Redirected the Implementation of the Database Redevelopment Project When Problems Arose During Early Testing

Chapter Summary

The Department of Motor Vehicles (DMV) continued its effort to fully implement the Database Redevelopment (DBR) project despite significant unresolved problems and deficiencies. The DMV progressed beyond the developmental stages of the DBR project—the operational assessment and the working model—even though it had failed to accomplish the objectives of each stage and had not resolved significant technical problems encountered during the development process. In its unsuccessful attempt to implement the DBR, the DMV spent an additional $34.6 million. Rather than complete each stage as planned, the DMV substantially modified the stages or failed to complete them altogether.

The DMV continued to develop the system and incur expenses without first solving technical and performance problems because the project's management desired to keep the project on schedule, incorrectly believed the technical problems could be resolved, and incorrectly asserted that critical developmental objectives had been achieved. Furthermore, the situation was allowed to continue because DMV management failed to establish an effective quality assurance process that would provide an independent assessment of progress and because management did not satisfactorily react when informed by the project's management team that problems existed. As a result, the DMV did not stop the project in June 1990 after the working model stage, when it had spent approximately $8.3 million to develop the system and incurred obligations of $6.5 million to purchase computers, for a total cost of $14.8 million. Instead, the DMV endeavored unsuccessfully to implement the project, ultimately spending another $34.6 million for a total project cost of approximately $49.4 million, on a system that has failed because of many of the unresolved technical and performance problems that were identified during the developmental stages of the project.

Significant Concerns Identified During Operational Assessment

A key technical concern arose during the DMV's testing of two relational database management systems. Specifically, the series of tests the DMV conducted, known as an operational assessment, indicated that the proposed system would require significantly more time to process transactions than the current system required. Additionally, the operational assessment did not fully test other critical technical concerns, such as the difficulty of redeveloping the software programs or the difficulty of establishing procedures to keep the system running smoothly. Because these areas were critical to the success of the DBR project, the DMV should have ensured that it resolved them during the working model phase of the project, which is discussed in more detail in the following section.

The operational assessment was designed to evaluate and recommend a database management system for the DMV to use in redeveloping its databases. A database management system is the basic software that provides the capability to store or retrieve data flexibly and accurately. The operational assessment consisted of a series of standardized tests applied to two database software products: Tandem Computers' NonStop SQL and IBM's DB2. The tests were designed to assess each product for continuous availability, performance, and ease-of-use. The DMV had previously narrowed the potential candidates down to these two products through an evaluation questionnaire sent to four companies offering products that the DMV identified as potentially able to satisfy its requirements.

A team composed of staff from the DMV, consultants hired by the DMV, the Stephen P. Teale Data Center (data center), and the vendors developed and executed the tests. Some of the operational tests were conducted at each company's laboratory, and some were conducted at the data center. The operational assessment primarily focused on a number of tests of the system's continuous availability, performance, and ease-of-use. The tests were conducted on a simulated database of vehicle registration records. This simulated database was much simpler in design than the ultimate design of the actual database system. For example, the design of relational databases is based on "tables." The simulated database contained 12 to 15 tables of data while the final design of the driver's license database contained more than 170 tables. In addition to the operational tests, the DMV evaluated the products, based on the vendors' responses to a written questionnaire, in other areas, such as the availability of training and computer-aided software engineering tools.

The DMV originally planned to conduct 47 operational tests, but because of time constraints the DMV prioritized the tests to fit within allowable time frames. The DMV deleted some tests because the DMV believed they did not relate to the products under evaluation, they tested low risk areas, or they were redundant with other tests. The DMV eventually performed 23 operational tests. The DMV designated 10 of the 47 planned tests to be key pass or fail tests. The DMV did not assign a pass or fail threshold to the other 37 tests, but intended to compare the two systems' performance on the tests. The DMV conducted all 10 of the key tests. Six of the key operational tests related to the system's response time. The other 4 related to the system's ability to recover from various equipment failures. The tests that the DMV dropped from the operational assessment included, among other things, assessments of the system's ability to do the following:

- Perform certain types of database modifications;

- Update the database statistics;

- Upgrade the system's software;

- Recover from an operating system failure; and

- Recover from a data center power failure.

The DMV completed the modified operational assessment in December 1988. Although the assessment resulted in the DMV selecting Tandem's NonStop SQL for its new database management system, it should be noted that neither Tandem nor IBM passed every key operational test. IBM passed three of the ten key operational tests and Tandem passed nine. The test that both vendors failed was the test of the system's response time while operating in the simulated "transitional architecture." The transitional architecture is the system that would allow the old database and the new database to operate simultaneously while the new system is gradually phased into operation. This and other technical features are discussed in more detail in Appendix C.

Although Tandem passed most of the tests, some tests were unrealistic given the DMV's actual requirements. For example, the DMV established 1.5 seconds as the performance standard for the operational tests of the system's response time per transaction. If the system took longer than this to process the transaction, it was considered to have failed that test. However, this standard was not

established based on the DMV's actual requirements, but was established only for comparing the two systems. The DMV's current system normally processes transactions in between .50 and .60 seconds and rarely exceeds 1.0 seconds. The DMV did not evaluate whether it could tolerate or compensate for an increased response time, nor did it evaluate how much of an increase in response time it could tolerate without changing its business processes.

In May 1989, the DMV's technical staff prepared an issue paper estimating the possible effects of the increased response time on the DMV's computer system. If the new system took 1.5 seconds to respond to each transaction, the result would be a loss of productivity for both the DMV's data entry operators and the DMV's external users. If the external users tried to compensate for the loss of productivity by processing more transactions simultaneously, this could result in the system's queue capacity becoming full, causing the system to be unavailable to other system users. In addition, the system would need more computer capacity to accommodate the longer queues of transactions waiting to be processed.

Thus, by early 1989, the DMV was aware that it needed to resolve significant technical problems related to the system's response time and its transitional architecture before it could be assured of the project's success. At the end of fiscal year 1988-89, the DMV had spent approximately $2.8 million on the project.

The Operational Assessment Was Not Independently Certified

During our review of the DBR consulting contracts, we noted that, contrary to the DMV's assertion, the operational assessment was not "independently" certified as fair to the participating vendors. The DMV contracted with Codd and Date Consulting Group (Codd and Date) to audit the operational assessment for fairness to the two vendors. One of the products that Codd and Date provided to the DMV as a result of this contract was a letter certifying the equity of the operational assessment to the vendors involved. The DMV considered this letter to be an "independent" certification of the operational assessment. However, since the DMV also contracted with Codd and Date to participate in the development of the operational assessment, assist in evaluating the potential vendors, and conduct and evaluate the results of the operational assessment, it raises questions concerning Codd and Date's ability to provide an unbiased certification of the operational assessment. According to one of Codd and Date's former

contractors, the certification was independent because Codd and Date subcontracted with another vendor to develop and evaluate the test results. However, since the DMV's contract was with Codd and Date, they would have been ultimately responsible for any work the subcontractor performed.

The DMV Failed To Develop a Working Model of the Project

The DMV failed to develop the planned working model of the project that would have tested the new system's high-risk design features. Instead, the DMV continued its efforts to implement the project despite the unresolved technical problems noted during the operational assessment and during its attempts to develop the working model. The DMV spent approximately $8.3 million to develop the system and incurred obligations of $6.5 million to purchase computers, for a total cost of $14.8 million, during the time it was attempting to develop the working model. The DMV had sufficient information in June 1990 to indicate that the project's feasibility was in doubt, but rather than reevaluate the project's feasibility, it proceeded with activities to fully implement the project.

In the project's feasibility study reports and other documents, the DMV stated that it would design and implement a working model of the DBR system. At various times, the DMV and the OIT referred to the working model either as a prototype or a pilot. In the system development process that the DMV planned to follow, the working model was considered the key step in determining whether the project, as designed, would be successful. The stated objectives of the DMV's working model included the following:

- Implementing an environment at the data center that would allow the DMV to develop and test DBR software programs;

- Implementing the transitional architecture;

- Implementing the pilot database;

- Implementing a pilot set of new on-line driver's license transactions; and

- Confirming estimates of subsequent development phases.

In particular, the working model would test the new system's high-risk features, including the following: (These technical features are discussed in detail in Appendix C.)

- The use of computer-aided software engineering (CASE) tools to rewrite the existing software programs;

- The increased response time noted in the operational assessment;

- The gradual movement of data from the old system to the new system, which necessitated the transitional architecture; and

- The DMV's requirement that the new system not affect the way in which the system's users conducted business. This requirement is known as "transparency."

In September 1988, the DMV stated in the project's second feasibility study report that "*portions of the prototype address high risk components of the system architecture. These components must be tested early in the prototype phase to ensure success of the Drivers License/Vehicle Registration Redevelopment project. Working tests are required for all high risk components to provide proof that a satisfactory solution exists.*" In addition, early prototyping would reduce the risk of failure, allow adequate time for modification or termination before a major commitment of resources, and provide the DMV with actual data to use in estimating the savings to be achieved after the system was fully implemented.

In September 1990, the DMV reported that it had successfully completed the working model and that it was ready to begin full implementation. However, this working model had not successfully accomplished its objectives and did not test the new system's high-risk design features. For example, the DMV had not successfully determined that the CASE tools could rewrite the existing software programs nor had it obtained actual data to use for its estimates of savings. In addition, the DMV was unable to reasonably estimate the amount of computer equipment needed to fully implement the system.

CASE Tools Failed

The DMV intended to use CASE tools on the DBR project to help transfer the software programs to the new system. In June 1990, the DMV terminated its contract with a consulting firm that was unsuccessful in its attempts to use selected CASE tools to transfer the existing software programs. The firm was not successful in this endeavor at least partially because the DMV and Tandem had decided to upgrade the Tandem NonStop database management operating systems, and one of the selected tools was not compatible with the

upgraded version of the operating system. Further, the company that supplied that tool was unable to adapt it to the upgraded Tandem systems. Despite this setback, the DMV reported, in September 1990, that the new system would achieve cost savings of approximately $8.9 million per year by fiscal year 1998-99, and it claimed that one component of the cost savings was to result from the benefits of the CASE tools, which would provide greater efficiency in maintaining the new programs compared to maintaining the old programs. This component of the savings estimate was based on a 1981 textbook on software engineering and a previous DMV pilot study on the benefit of using a different CASE tool than the one that the DMV had selected for the DBR project. The DMV did not base the savings estimate on its actual experience attempting to use CASE tools on the DBR project, which had, by September 1990, been unsuccessful. Finally, the DMV reported in August 1991, that the CASE tools that it had selected for the DBR project had failed.

**Estimates of Personnel Savings Not
Based on Working Model Results**

Another component of the DMV's savings estimate related to savings in personnel costs in the Headquarters Operations Division resulting from changes to the driver's license database. The DMV estimated that it could eliminate 30 existing positions and avoid the projected addition of 20 positions by permitting easier modifications to the driver's license file and enhanced processing of information requested from the driver's license file. The DMV did not base this estimate on benefits demonstrated by a working model, but based it on the assumption that these tasks would be made more efficient during the development of the DBR project.

**Computer Equipment Needs
Were Grossly Understated**

The DMV's estimate of the amount of computer equipment needed for the fully implemented DBR was grossly inaccurate. In October 1990, the DMV's technical staff reestimated computer requirements to support implementation of the driver's license system only. The analysis indicated that eight Tandem computers would be needed for the driver's license system. The OIT approved the purchase of six of the computers with the understanding that two more may be needed later. In December 1990, six Tandem computers, costing $11.9 million, were acquired to implement the driver's license system,

in addition to the $6.5 million in Tandem computers to develop the working model of the DBR. Since no detailed design work was performed on vehicle registration, computer requirements to support this portion of the project were not reestimated beyond the original figures included in the operational assessment. In August 1993, Tandem and EDS prepared an estimate of the computer equipment required to support the entire DBR project. They determined that 32 equivalent computers would be required to support the driver's license system, compared to the original estimate of 6 to 8 computers—an increase by a factor of at least 4.0. About half of this increase was for equipment needed to meet the continuous availability requirement.

Other Key Objectives Were Not Met

In addition to the problems with the CASE tools and the underestimation of the computer equipment, the DMV did not meet other key objectives of the working model before it progressed to fully implementing the system. For example, in September 1990, the data center had raised concerns with the DMV about the Tandem computer's ability to operate 24 hours per day, 7 days per week. Moreover, the DMV had been unsuccessful at designing the transitional architecture needed to gradually move data from the old system to the new system. In October 1992, the DMV reported that the original design of the transitional architecture was not usable because it was too cumbersome. Furthermore, the DMV did not provide us with any evidence that it had resolved the problems associated with the increased response time identified in the operational assessment.

The DMV Inappropriately Proceeded With Activities To Fully Implement the Driver's License Component of the DBR Project

In June 1990, after the DMV had spent approximately $8.3 million to develop the system and incurred obligations of $6.5 million to purchase computers, for a total cost of $14.8 million on the project, the DMV proceeded with activities to fully implement the driver's license system, despite the significant technical problems that remained unresolved. In September 1990, the DMV reported to the OIT that it had completed a pilot of the driver's license system and requested approval to begin implementing the system. Although the reported pilot successfully transferred 10 percent of the driver's license records to the Tandem system, it was not a working model because it did not have software programs that could access, manipulate, or change the data in the Tandem system, nor did it test the feasibility of the transitional architecture needed to gradually move data from the old system to the new.

Despite the tremendous effort directed at the DBR project, the DMV was unable to redevelop the software programs that support the DMV's primary responsibilities of licensing drivers and registering vehicles. In addition, it was unsuccessful in designing the transitional architecture. The DMV spent an additional $34.6 million after it began to fully implement the driver's license system, bringing the total project costs to approximately $49.4 million. Had the DMV prudently managed the DBR project, it should have stopped to reevaluate the project's feasibility in June 1990 in response to significant evidence that the project, as designed, would be infeasible.

The DMV Also Failed To Heed Concerns Raised During Quality Control Reviews

Not only did the DMV fail to achieve the planned developmental objectives that would have identified problems, but it also failed to include independent quality control as part of the DBR project. Also, the DMV allowed the project to continue despite significant problems noted during periodic reviews performed by both independent and internal parties. In May 1990, the DMV hired a consultant, Computer Deductions, Incorporated (CDI) to provide technical assistance and periodic project reviews. However, CDI could not provide independent quality assurance because the DMV also contracted with this contractor to perform project planning and developmental work on the project. Therefore, the contractor was performing reviews on a project that consisted, in part, of its own work. Further, according to the former chief of EDP Services, the DMV established no formal quality assurance function to be performed from the beginning of the project at a detailed level by an independent, qualified source who could raise questions concerning the work performed by either the state personnel or contractors during the course of the project. Instead of an independent quality assurance function, the DMV relied on periodic project reviews and prepared special project reports that were distributed to the OIT. The DMV conducted internal status meetings to review project status and to resolve issues. Together, the DMV expected these elements to provide sufficient quality assurance.

Quality assurance is a function performed on systems development projects to ensure an independent and impartial assessment of the project's methods and techniques and of the work products produced during the course of systems development. Among its objectives, quality assurance is expected to assess the project's adherence to commitments made by the DMV and to estimate the likely outcome of the project. Often, suggestions are made to resolve actual or anticipated problems before they become insurmountable. In essence, the persons performing quality assurance might be considered analogous to building inspectors who keep an independent watch over

the construction process to ensure it conforms with preestablished performance standards.

As a result of its periodic project reviews, CDI reported on a number of occasions that the project was experiencing problems. For example, from June 1990 to June 1991, CDI reported that the project had the following problems:

- It was on an incorrect course;

- It lacked leadership;

- It had made no progress on main tasks;

- It lacked Tandem-experienced staff because neither the DMV nor contractor staff had much Tandem experience; and

- The use of CASE tools continued to be a major risk factor.

In June 1991, CDI recommended a project reassessment because it was seriously concerned about the direction of the project. This report specifically stated that CDI was concerned about the dependence on the transitional architecture, the lack of knowledge about the current system and the resulting dependence on CASE tools, the requirement to jump from 1960s technology to 1990s technology in one step, and the feasibility of the requirement to maintain user transparency.

In addition to the CDI reviews, the Department of Finance's Program Evaluation Unit (PEU) conducted a compliance review of the DBR project in 1990. The PEU provided its final report on this review to the DMV in March 1991. During this review, the PEU found that the DMV intended to place the system into production without completing a pilot to estimate the costs and benefits of the project. Instead, the DMV estimated costs and benefits based on industry studies. Moreover, the PEU found the project was not proceeding on schedule because the DMV's schedules were overly optimistic. Specifically, the PEU's final report stated, "*the DMV had intended, until very recently, to implement the pilot consisting of a full database conversion and 70 percent of the driver's license on-line and batch applications. Twenty-three to 25 million records were to be loaded in June 1990 for testing. The entire driver's license database has about 30 million records. This means the DMV planned to use most (80 percent) of the database for the pilot. According to Tandem representatives, the pilot should be large enough to produce ad hoc reports, production reports and data, and other database functions to demonstrate and then*

project, potential benefits and advantages of the system. They also stated that a much smaller pilot (20 percent of the database) could be run using proprietary modeling tools developed for Tandem systems to project systemwide performance. However, running a smaller pilot did not fit with the project schedule developed by DMV and Tandem representatives. They expected the Tandem Cyclone (production machine) to be installed and operational before May 1990. However, it was not installed because the OIT did not agree that production level processors (Tandem Cyclone) were needed to run the pilot. Installation of these processors before receiving and analyzing the pilot demonstration results could burden the State with a production system which may not be the best solution."

The PEU also found that the project was seriously delayed because, among other things, the DMV's efforts to use various CASE tools were unsuccessful, the development of the transitional architecture was delayed, and the development of the conversion procedures and programs was not completed on time. Although this report indicated serious problems with the project, the DMV took no action in response to the report and continued its implementation efforts.

In addition to the foregoing critical reviews, the project's management provided periodic assessment reports to DMV's management. Beginning in 1991, these reports indicated that the project was experiencing significant difficulties. In an August 1991 report, the project's management documented many of the problems, including the following:

- A lack of knowledge of Tandem systems among DMV staff;

- Difficulties in designing the Tandem system to accommodate batch processing, one of DMV's critical functions;

- Failure of the selected CASE tool; and

- Difficulty recruiting staff experienced in Tandem systems at both the DMV and the data center.

As a result of these problems, the DMV increased the estimated development costs of the project from $31.4 million to $38.3 million and extended the estimated completion date by six months. However, the DMV continued to project that significant cost savings would be achieved once it implemented the project. In addition, the DMV's management should have resolved problems indicated in its internal

project assessment and reevaluated the project's feasibility before continuing to devote resources to the project.

The DMV prepared another report in October 1992 that also indicated the DMV was experiencing major problems with the project. At this time, the DMV increased the estimated development costs from $38.3 million to $57.3 million and extended the estimated completion date from July 1995 to December 1998. Among its reasons for the increases, the DMV reported it had underestimated the scope of the project, the system architecture design took much longer than planned to complete, and the development process proved to be more complex than expected. Specifically, the DMV stated, *"the experience gained in redeveloping the driver's license database has given the DMV a sobering insight into the dimensions of the tasks that lie ahead. The effort proved to be larger, more complex, and much harder than originally conceived."* Again, the DMV's management should have resolved the problems indicated in this second report and reevaluated the project's feasibility before continuing to devote resources to the project.

According to the DMV's former chief of EDP Service, the project's management felt that it could eventually overcome the technical problems. Therefore, the DMV's management saw no reason to halt the project.

Additional Costs Incurred in Attempted Implementation

The $34.6 million in additional costs related to the DMV's decision to implement the project occurred in four areas. The DMV spent $5.7 million in contractor fees; $17.4 million for data center costs, which include the purchase of computer equipment; $10 million in DMV staff costs; and $1.5 million for other project expenses.

From July 1990 to December 1993, the DMV spent approximately $5.7 million on five consulting services contracts with four contractors and on technical services obtained through master services agreements. Three of the four contractors provided the same type of services. These contractor services included the following:

- Providing technical project leadership;

- Designing software development, including the use of CASE tools;

- Assisting in the development of the transitional architecture; and

- Assisting in designing, testing, and converting the software and databases to the new system.

The fourth contractor provided training and support on a CASE tool purchased from the CASE contractor.

Of the $17.4 million in data center costs, $11.9 million was for six Tandem Cyclones and related equipment, and the remaining $5.5 million was for other data center costs, such as computer equipment maintenance, software obtained from companies other than Tandem, and data center administration costs. The purpose of the six computers was to provide the computer capacity to accomplish the first stage of implementation, which was the redevelopment of the driver's license database. This purchase brought the total computer investment to $18.4 million. The DMV purchased these computers at the end of 1990, and the data center installed them in January 1991. Approximately $3.9 million of the $11.9 million in equipment purchases represents obligated payments for the Cyclones during fiscal years 1994-95 and 1995-96.

From July 1990 to June 1994, the DMV spent approximately $10 million of its own staff time attempting to implement the DBR project. In this attempt, its staff and contractors engaged in the following:

- Developing a business model to document the DMV's business requirements;

- Documenting and analyzing the current system's data and software programs;

- Attempting to design a workable transitional architecture;

- Attempting to redevelop the software programs for the new system; and

- Copying the driver's license database and transferring this copy to the new computer.

In addition, the DMV's staff spent time "normalizing" and "scrubbing" the database. By August 1990, the DMV was aware that the new system could not tolerate the number of errors and irregularities that the old database system contained. As a result, the DMV would have to clean up the driver's license database in preparation for its transfer to the new system. This cleanup entailed the following:

- Identifying obsolete, redundant, and multiple-use data fields;

- Verifying that the data in each record was correct;

- Verifying that the data items in each record were logical when compared with the other data items; and

- Identifying and correcting millions of errors and inconsistencies in the database.

In addition, the DMV's staff developed software programs that would perform this data scrub automatically. Although the DMV knew of this requirement by August 1990, it never evaluated the amount of effort required to accomplish the cleanup. Therefore, these activities consumed more time and resources than the DMV had estimated they would.

After the DMV scrubbed the driver's license database and transferred it to the new system, it developed a software program to access the information in the new database. This program performs an on-line address search that identifies an individual's name and driver's license number from the individual's address. Law enforcement agencies are the primary users of this service. This program is not one that supports any of the DMV's primary responsibilities, such as licensing drivers and registering vehicles. In addition, the DMV developed a program to update the Tandem database periodically to keep the information current with the old database.

Despite the major investment in the project, the DMV still has not successfully developed a transitional architecture or any of the software programs that support the DMV's basic responsibilities of licensing drivers and registering automobiles. At the time the DMV decided to terminate the project, it had spent approximately $49.4 million.

In April 1994, the DMV estimated that approximately $12.7 million of the DBR project costs resulted in assets with continuing value to the DMV. However, many of the particular items included in the $12.7 million estimate should have been accomplished before the DBR project was attempted or are in actuality part of the sunk costs of the project. Further, although the DMV claims that $12.7 million of the total DBR costs of $49.4 million represents assets of continuing value, it is not currently possible to determine the future value to the DMV for these costs that were incurred.

Conclusion   The DMV continued its efforts to more fully implement the project, despite continued failures in the critical aspects of its development, and, as a result, spent an additional $34.6 million on a project that ultimately failed.   The DMV should have evaluated the size and complexity of the DBR project, as well as the difficulty of implementing it, during the working model stage the DMV established in the original development plan.   Because the DMV failed to complete the working model, it was unable to determine the project's technical feasibility and was unable to reasonably estimate the project's costs and benefits.   Without a determination of the project's technical feasibility, the DMV could not be assured that the system would perform its required functions.   This lack of assurance increased the risk the project would fail.   Without a reasonable estimate of the project's costs and benefits, the DMV could not be assured that the system was economically beneficial and that the project could be successfully implemented within the approved budget.

Because the DMV failed to complete the working model, ignored the failures that occurred in its developmental efforts, and failed to heed the concerns raised in internal and external project reviews, it missed every opportunity to stop and reassess the project and develop a more realistic concept of its dimensions.

Recommendations   To ensure that the DMV does not unnecessarily incur costs of this magnitude in the future, the DMV should complete the milestones it establishes for the development of new EDP contracts.   The DMV should also conduct sufficient testing and analysis to determine that proposed EDP projects will achieve their projected benefits, both monetary and programmatic.   Finally, the DMV should ensure that technical problems identified during quality assurance reviews of EDP projects are resolved before continuing to devote resources to those projects.

Chapter 2 **The Office of Information Technology
Should Not Have Recommended Continued
Funding for the Database Redevelopment
Project When the Department of Motor
Vehicles Did Not Follow the Approved
Policies To Minimize Financial Risk**

**Chapter
Summary**

The Office of Information Technology (OIT) continued to recommend approval of additional funding for the Department of Motor Vehicles' (DMV) Database Redevelopment (DBR) project despite the fact that the DMV had not followed approved policies to minimize financial risk to the State. The OIT has the statutory responsibility to approve proposed expenditures for electronic data processing projects only if the policies and procedures it has published in the State Administrative Manual have been met. The OIT allowed the DMV to attempt to put the DBR project into operation even though it knew the DMV had not successfully developed a working model of the project as OIT had previously required before the DMV could proceed.

Furthermore, the project was allowed to continue because the OIT continued to recommend approval for additional funding even when it received a report that the DMV was not developing the system consistent with requirements from the OIT and consistent with the policies and procedures published in the State Administrative Manual. When the OIT became aware the DMV had begun to fully implement the project in June 1990, the DMV had spent approximately $14.8 million. This amount consisted of $6.8 million that the OIT had authorized to develop a working model and $3 million in resources that the DMV had improperly redirected from other funding sources and had not reported in its special project reports to the OIT. In addition, it included $5 million still owed on $6.5 million of computer equipment obligations that the OIT had authorized but would be included in subsequent years' budgets.

In November 1990, the OIT should not have recommended continued funding when the DMV requested an additional $3.9 million for fiscal year 1991-92. Ultimately, as of June 30, 1994, the DMV spent an additional $39.6 million. This amount consisted of $25.7 million of budgeted funding that had been authorized to complete the working model and to fully implement the system; $10 million in resources

redirected from other DMV funding sources that had been preapproved by the OIT; and $3.9 million in computer equipment obligations that the OIT had authorized but would be included in subsequent fiscal years' budgets.

The OIT Is Responsible for Reviewing the State's Information Technology Acquisitions

The OIT was established in 1983 as a division within the Department of Finance. According to the Government Code, Section 11700, the purpose of this office is to identify new applications for information technology, to improve productivity and service to state agencies, and to assist state agencies in designing and implementing the use of information technology. Also, according to Section 11731 of the code, the OIT must adopt policies and guidance to carry out the budgeting and control of expenditures for electronic data processing. This code section also states that the OIT must approve proposed expenditures for electronic data processing only if established policies and procedures, which have been published and maintained in the State Administrative Manual, have been met and followed. In addition, Section 11711 states that the OIT's director must develop plans and policies to support and promote the use of innovative information technologies within state government as a means of saving money, increasing worker productivity, improving state services to the public, and demonstrating effective management tools.

According to the current deputy director, the OIT serves as an investment committee to determine whether proposed information technology projects would be a reasonable investment of the State's resources. This determination is based on a conceptual and high-level technical review of how the technology addresses each department's business problems and needs. The OIT reviews the technical viability of a proposed project by determining that the characteristics of the technology are consistent with the needs of the department. The OIT performs its oversight role through their review of information included in submitted feasibility study reports, special project reports, and other required reports; through on-site discussions with departmental staff to verify information contained in the reports; on-site discussions with vendors, consultants, and staff of other agencies that have knowledge of the technology to be employed; and, on occasion, reviews by outside consultants hired by the OIT. Also, the OIT's role as the investment committee includes making recommendations for budget augmentations for information technology projects to the Department of Finance's Budget Units. These recommendations, once approved by the Budget Units, the governor, and the Legislature, allow departments to obtain the funding necessary to complete their information technology projects.

The OIT's Review Process

The mechanism for initially approving information technology projects is the feasibility study report. The OIT reviews feasibility study reports to provide an analytical basis for whether the proposed project should be approved, disapproved, or approved on a modified basis. During the project life cycle, special project reports are also required to be submitted to the OIT if total project costs or anticipated project costs deviate 10 percent or more (higher or lower) from the original estimates, the project schedule falls behind or is anticipated to fall behind 10 percent or more, the program benefits deviate or are anticipated to deviate by 10 percent or more, or a major change occurs in the project requirements or methodology. The OIT must approve all special project reports if the OIT has previously approved the project feasibility study report. Until this kind of report is approved, departments can only continue work on the project as previously approved either in a previous feasibility study report or previous special project report.

The OIT approved the first feasibility study report for the DBR project in December 1987. The approval recommended the DMV receive development costs for the project of $1.5 million for fiscal year 1988-89 and $1.9 million for fiscal year 1989-90. The DMV submitted a second feasibility study report to the OIT in November 1988. This report was approved by the OIT in December 1988. Included in the approval were the requirements that the DMV not proceed with full implementation until after the OIT had approved the DMV's completion of the objectives included in the first feasibility study report and a working model of the project. Also, the OIT recommended expenditures of an additional $3.4 million for fiscal year 1989-90 and subsequently recommended $3.7 million for fiscal year 1990-91. In total, the OIT authorized $10.5 million to develop the project through the working model stage.

The OIT Should Not Have Accepted the Operational Assessment as Satisfying the Requirements of DMV's First Feasibility Study Report

In February 1989, the DMV submitted a letter to the OIT stating that it had accomplished the objectives of the first feasibility study report. These objectives were to confirm database design, to confirm that the database system would work, to complete necessary design tasks, to estimate computer resources, to confirm the feasibility of the planned transitional architecture, and to simulate the performance of high-volume driver's license and vehicle registration programs. The DMV was to accomplish these objectives by defining the technical requirements of the database, developing a prototype transitional architecture, and developing a database design. Also, the DMV was to test the prototype to determine if performance issues and technical requirements were *resolved*, and it was to finalize the implementation

plan. As previously discussed in Chapter 1, we found the DMV had not designed the operational assessment to meet the objectives of the first feasibility study report but instead designed the operational assessment to evaluate and recommend a database management system for the DMV to use in redeveloping its databases. Nevertheless, the OIT's former chief of Statewide Oversight accepted the DMV's operational assessment as meeting these objectives.

During our fieldwork, we found that the OIT was unable to provide any documentation to prove it had reviewed the operational assessment. We subsequently contacted the former chief of Statewide Oversight who accepted the operational assessment as meeting the requirements of the first feasibility study report. He stated that the DMV's operational assessment was a prototype that was limited to determining if relational database technology could be used to meet DMV's needs. Further, the next task to be performed, a working model of the project, would have validated the results obtained from the prototype and would have provided information for determining if this type of technology would be cost-effective in modernizing the DMV's databases. Moreover, he stated that, at the time, he believed the DMV's operational assessment showed that relational database technology could be used to meet the DMV's needs.

Thus, because the OIT accepted the DMV's operational assessment as satisfying the requirements included in the DMV's first feasibility study report, the DMV was allowed to proceed with the project even though the DMV failed to successfully complete three of the report's primary objectives. These objectives included confirming the database design, completing necessary design tasks, and confirming the feasibility of the transitional architecture. For example, the database design and feasibility of the transitional architecture were not confirmed because they were subsequently found to be unusable. As previously discussed in Chapter 1, an October 1992 report issued by the DMV concluded that the original design of the transitional architecture was unusable because it was too cumbersome, and the design and development process proved to be more complex than expected. Therefore, if the three objectives of confirming the database design, completing necessary design tasks, and confirming the feasibility of the transitional architecture had been fully tested during the DMV's operational assessment, the DMV would have identified these key system deficiencies and not continued with a full implementation of the project. As a result of the OIT's acceptance of the operational assessment, the DMV's spending was not limited to the $3.4 million

that was approved in its first feasibility study report. Instead, they were allowed to spend the funds approved in the second feasibility study report of $8 million.

The OIT Failed To Require Implementation of a Working Model of the Project

The approval of the DMV's second feasibility study report in December 1988, also required the DMV to complete a working model of the driver's license database. The objectives of the working model included implementing an environment at the Stephen P. Teale Data Center (data center) to allow the DMV to develop and test DBR software programs, implement the transitional architecture, and confirm estimates for subsequent development phases. These objectives were to be accomplished by executing a working model for the driver's license database, including a set of on-line driver's license transactions to be processed using the working model. OIT's approval of the second feasibility study report specifically required the implementation and evaluation of the working model using parallel production data. The working model also would have provided information pertaining to the objectives of the DMV's first feasibility study report that were never addressed in the operational assessment.

During fall 1990, the DMV submitted a special project report. In it, the DMV requested approval for fully implementing the project, as opposed to completing a working model of the project. The OIT approved this special project report, even though the OIT was aware the DMV had already begun major work on the full production system and had not completed the working model before the submission of this special project report. For example, in June 1990, a letter was sent from the OIT's director to the DMV's director that stated that the OIT had become aware that the actual project was significantly different from the documented and approved project, and that the DMV had failed to accomplish the working model and had begun work on the full production system. It also stated that the working model was approved to allow the DMV, with minimum risk and expense, to confirm that the expected system benefits could be captured and to verify whether or not the project was worth continuing. Further, it stated that the DMV had spent two years, and more than $5 million on the project; and that OIT could not continue to support an effort of this magnitude in the absence of information indicating that the State would receive an adequate return on its investment. Finally, it required the DMV to prepare a special project report to accurately update the project status and propose a cost-effective continuation for OIT to use as its basis for continued support in the upcoming budget cycle.

The OIT subsequently received a special project report in September 1990 that was not approved until November 1990. This approval allowed the DMV to receive additional funding for fiscal year 1991-92. We also found that as of June 1990, the DMV had spent approximately $14.8 million as opposed to the $5 million indicated in the OIT's letter to DMV. The $14.8 million consisted of $6.8 million that the OIT had approved to develop a working model, and $3 million of resources that the DMV had redirected from other projects and had not reported in its special project reports to the OIT. In addition, it included $5 million still owed on $6.5 million of computer equipment obligations that the OIT had authorized but would be included in subsequent years' budgets.

In September 1990, the OIT received a draft copy of an Electronic Data Processing Compliance Review conducted by the Department of Finance's Program Evaluation Unit at the OIT's request. This review found that the DMV was moving ahead with the project without completing the required working model, underreporting actual costs, over budget on the project and not proceeding according to agreed-upon implementation schedules, and was not preparing project reports in accordance with the State Administrative Manual or OIT requirements. The review also found that the activities performed during DMV's operational assessment did not demonstrate the expected performance and benefits of the proposed system based on the focus of the testing. The OIT could not provide any documentation that any action was taken in response to this report.

We discussed the compliance review with the former chief of Statewide Oversight. He stated that he remembered this report and that it identified quite a few problems with the project. However, OIT staff took no action as a result of this report.

We also spoke with the former acting director of OIT, who approved the November 1990 special project report. He stated that he did not see the draft compliance report at all before the final report was issued. In addition, he stated he did not follow up on the final audit report because, at the time it was issued, the prior director of the OIT was in the process of being reinstated. Also, he was not aware it had been received, as it was given directly to the line staff working on the DMV oversight, and was never shown to him. Further, this individual stated that he allowed the project to continue in November 1990 because of its great potential value, the lack of objective evidence that it was failing, and the opinion of technical OIT and Budget staff that it should be funded for another year.

Thus, because the OIT approved the fall 1990 special project report, the DMV was allowed to proceed with the project without completing a working model, which again would have identified significant technical and performance issues, confirmed the costs and benefits associated with the project, and provided assurance of the project's success. Also, for fiscal years 1990-91 through 1993-94, the DMV ultimately spent approximately $39.6 million attempting to fully implement the system, including $5 million for computer equipment purchases obligated before fiscal year 1990-91. This amount consisted of approved budgeted funding for the project during fiscal years 1990-91 through 1993-94 of approximately $25.7 million. The budgeted funding for these fiscal years included $3.7 million to complete the working model during fiscal year 1990-91; and $7.6 million during fiscal year 1991-92, $7.2 million during fiscal year 1992-93, and $7.2 million during fiscal year 1993-94 on implementation. Also, the DMV expended $10 million in resources redirected from other DMV funding sources, and incurred $3.9 million in computer equipment obligations that the OIT had approved but that would be included in subsequent fiscal years' budgets.

Conclusion

The OIT continued to recommend approval of additional funding for the DMV DBR project despite the fact that the DMV had not followed approved policies to minimize financial risk to the State. Specifically, the OIT allowed the DMV to attempt to put the DBR into operation, even though it knew the DMV had not successfully developed a working model of the project as the OIT had previously required before the DMV could proceed. Furthermore, the project was allowed to continue because the OIT continued to recommend approval for additional funding even when it received a report that the DMV was not developing the system consistent with the requirements from the OIT and consistent with the policies and procedures published in the State Administrative Manual. When the OIT became aware that the DMV had begun to fully implement the project in June 1990, the DMV had spent approximately $14.8 million. This amount consisted of $6.8 million that the OIT had authorized to develop a working model and $3 million in resources that the DMV had improperly redirected from other funding sources and had not reported in its special project reports to the OIT. In addition, it included $5 million still owed on $6.5 million of computer equipment obligations that the OIT had authorized but would be included in subsequent years' budgets. If the OIT had exercised its authority and not approved the DMV's proposed expenditures subsequent to June 1990, when it found the DMV was not adhering to the OIT's requirements and established policies and

procedures, the DMV would have been unable to continue its efforts to fully implement the project and expend the additional $39.6 million during fiscal years 1990-91 through 1993-94.

Recommendations

To ensure that departments are following approved policies to minimize financial risk, the OIT should exercise its authority to approve proposed expenditures for electronic data processing only if established policies and procedures, which have been published and maintained in the State Administrative Manual, have been met and followed. Also, the OIT should ensure that departments accomplish the objectives and requirements included in approved feasibility study reports and special project reports before allowing projects to move forward.

Chapter 3 **The DMV's True Costs of the DBR Project
Are Higher Than Originally Reported**

Chapter Summary

The Department of Motor Vehicles (DMV) did not use a cost-reporting system to monitor expenditures related to the Database Redevelopment (DBR) project. As a result, it could not identify all of the expenditures related to the DBR project. Specifically, we identified that the DMV's actual and obligated costs for the DBR project were at least $49.4 million, which is $5.1 million more than the $44.3 million in project costs that the DMV originally reported to the Legislature and the Department of Finance. In addition, we determined that the DMV did not receive preapproval to increase spending above the level previously authorized by the Department of Finance.

The DMV Did Not Accurately Monitor Costs for the DBR Project

The DMV did not use a formal cost-reporting system to monitor expenditures related to the DBR project. According to the DMV's controller, the DMV implemented a cost-accounting system for the entire department in 1981 and linked it with its existing accounting system. Shortly thereafter, the DMV decided to discontinue the use of this cost-accounting system. The DMV made this decision primarily because it determined the system became cumbersome because of the additional time and resources the divisions spent in preparing and processing the necessary data required to use the system. In addition, the DMV also determined that the benefits of the cost-reporting system were not significant enough to justify its use.

Since the DMV does not currently have a departmental cost-reporting system, it delegated the responsibility for monitoring project costs to its divisions. In the case of the DBR project, the Electronic Data Processing (EDP) division manually kept track of project expenditures for the purpose of reporting this information to the Department of Finance. EDP division staff prepared expenditure schedules based on supporting documentation, such as contracts, purchase orders, and invoices. However, the division did not establish uniform criteria to identify those costs to be reported as DBR project expenditures. As a result, the DMV did not accurately monitor expenditures related to the DBR project. Specifically, we identified several errors in the summary of project expenditures supporting the 1994 report to the Office of Information Technology (OIT). We also identified other project expenditures that the DMV omitted from the schedule.

The DMV presented a summary of project expenditures (cost summary) in its special project report dated April 1994. The cost summary presented actual expenditures through December 1993 and projected expenditures between January and June 1994, all totaling $39.5 million. In addition, the report also specifies that the DMV has additional obligations of $4.8 million to pay during fiscal years 1994-95 and 1995-96 to the Stephen P. Teale Data Center (data center) on the installment purchase of the Tandem Cyclone system. Therefore, according to the special project report, the total actual and obligated DBR project expenditures were $44.3 million. Based on our review of the DMV's supporting documentation, we identified an additional $5.1 million that the DMV did not report on the cost summary. Table 1 summarizes the total expenditures for the DBR project and those we identified as missing from the DMV's schedule.

Table 1   **Reported, Unreported, and Total**
Expenditures for the DBR Project
(In Thousands)

	Reported Expenditures Per 1994 Special Project Report	Unreported Expenditures	Total Expenditures
DMV Staff	$10,210	$2,400	$12,610
Consultants	6,690	1,571	8,261
Other DMV Costs	2,972	0	2,972
Data Center Costs			
Through June 30, 1994	19,649	1,986	21,635
After June 30, 1994	4,768	(857)	3,911
Total	**$44,289**	**$5,100**	**$49,389**

DMV Staff Expenditures

We identified that total personnel expenditures from fiscal year 1987-88 through fiscal year 1993-94 were approximately $12.6 million, instead of the $10.2 million reported in the cost summary. The difference of $2.4 million is due to the method the DMV used to compile these costs. To calculate the total staff expenditures for the project, the DMV combined the total annual salaries of employees in the EDP division who worked on the DBR project. However, this methodology is based on two key assumptions: employees identified worked 100 percent of their time on the project and EDP staff were the only employees working on the project. According to the DMV's

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controller, the DMV does not have a labor cost system in place to monitor the number of hours employees spend working on different projects. Therefore, to assist us in calculating the actual costs of staff resources used in the DBR project since its inception, the administrative staff prepared schedules identifying all the employees who worked on the DBR project as well as the percentage of the year that they committed to the project. We reviewed these schedules and determined that there were several employees that were not included in the cost summary.

Consultant Expenditures

We identified nearly $1.6 million of consultant expenditures that the DMV did not report in the cost summary. The EDP division staff did not maintain complete and accurate schedules supporting consultant expenditures for fiscal years 1991-92 through 1993-94. For example, approximately $1.1 million of the $1.6 million in unreported costs relate to consultant expenditures for two contractors during fiscal year 1991-92. The EDP staff had incorrectly reported these expenditures on the cost summary. We also found that staff were unable to provide us with schedules that support consulting expenditures incurred before fiscal year 1991-92.

Data Center Expenditures

The DMV entered into interagency agreements with the data center for the purchase of hardware and software related to the DBR project on behalf of the DMV. These purchases included the acquisition of the CLX/VLX system and the Cyclone system from Tandem Computers, Inc. As displayed in Table 1, the data center incurred a total of $21.6 million in expenditures on the DBR project through fiscal year 1993-94.

Based on the data center's detailed cost reports, we identified additional expenditures of approximately $2 million, which the DMV did not include in the cost summary because the data center was not charging the DMV for all project costs. This amount is comprised of two main components. According to the manager of the fiscal and business operations branch at the data center, the data center and the DMV negotiated a fixed rate that the DMV would pay for the purchase of the CLX/VLX system. The data center established this rate using an estimated purchase price for the system of approximately $4.8 million. The data center's final negotiated contract with Tandem set the price of the system at approximately $6.5 million. However, the data center did not increase the fixed rate that the DMV paid. Therefore, the data

center underbilled the DMV by $1.7 million during the period from May 1989 through April 1994. In addition, the data center did not bill the DMV for telecommunication costs totaling approximately $247,000 during the period from May 1989 to June 1991. As a result, the DMV was not aware of its actual costs that the data center incurred. Accordingly, it appears that the data center recovers the difference in costs incurred and billed through monthly service rates that it bills to all client agencies.

In addition, the DMV identified an additional $4.8 million in obligated expenditures during fiscal years 1994-95 and 1995-96 for the purchase of the Cyclone system. The DMV is obligated to make monthly payments through January 1996 for this purchase. However, according to the Tandem contract, payments for the period from July 1994 through January 1996 add up to only $3.9 million. Therefore, the DMV overstated its future obligated expenditures by approximately $900,000.

The DMV Did Not Receive Preapproval To Increase Expenditures Above the Level Previously Authorized by the Department of Finance

The DMV did not receive preapproval to increase expenditures for the DBR project above the level previously authorized by the Department of Finance. As described in Chapter 2, a state agency engaging in an information technology project which is subject to approval and oversight by the OIT, is required to submit a special project report under certain circumstances. One of these circumstances is when the total information technology project costs deviate or are anticipated to deviate by 10 percent (higher or lower) from the estimated information technology project budget. Section 4819.35 of the State Administrative Manual states that if the agency is required to submit a special project report, the agency shall not expend additional funds to implement the proposed change until the OIT approves the special project report.

During fiscal years 1988-89 and 1989-90, the OIT authorized the amount of expenditures for the DBR project through its review of the annual budget change proposals and its approval of the feasibility study reports. According to these documents, the OIT authorized the DMV to spend up to $1.5 million during fiscal year 1988-89 and up to an additional $5.3 million during fiscal year 1989-90. However, according to Appendix D, the DMV reported that it spent approximately $1.7 million during fiscal year 1988-89 and approximately $6.3 million during fiscal year 1989-90. In each year, the amount that the DMV spent exceeded the amount that OIT authorized by more than

10 percent. However, the DMV did not submit a special project report during either year requesting preapproval to increase expenditures above the level previously authorized by the OIT.

In 1990, the DMV submitted a special project report that the OIT approved. The OIT prepared a schedule of actual and projected expenditures for the DBR project in order to determine the total amount of expenditures that it would authorize the DMV to spend on the DBR project. According to this schedule, the OIT authorized the DMV to spend up to $77.3 million between fiscal years 1990-91 and 1993-94. However, according to the current deputy director of the OIT, the OIT cannot identify the amounts in the special project report that are used to determine the authorized costs. As a result, we are unable to determine whether the DMV exceeded the project costs that the OIT authorized for fiscal years 1990-91 through 1993-94.

Conclusion

We determined that the DMV's true costs for the DBR project are $5.1 million higher than originally reported because the DMV did not correctly identify all of its project expenditures. Based on our review of agency documentation, we determined that total actual and obligated project expenditures are at least $49.4 million. If the DMV had used its project cost-reporting system, it could have more accurately identified all project expenditures. In addition, we determined that the DMV did not receive preapproval to increase spending above the level previously authorized by the Department of Finance.

Recommendations

The DMV should implement a project cost-reporting system for EDP projects in order to report accurate expenditures on its special project reports. In addition, the DMV should obtain approval from the Department of Finance if it expects to deviate by more than 10 percent from the level previously approved for an information technology project.

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Chapter 4

The Department of Motor Vehicles Violated Numerous Contracting Laws and Regulations

Chapter Summary

The Department of Motor Vehicles (DMV) violated numerous state laws and regulations related to the execution of purchase orders and contracts when acquiring goods and services for the Database Redevelopment (DBR) project. Specifically, the DMV falsified a $46,000 purchase order to pay for services for which it otherwise could not have paid. In addition, it entered into sole-source contracts without adequate justification, modified the terms of a contract without formally amending it or receiving the Department of General Services' (DGS) approval, and allowed work to be performed before contracts were approved. It also failed to obtain performance bonds on some electronic data processing (EDP) contracts.

The DMV Falsified a Purchase Order To Pay for Services Provided Before a Contract Was Executed

The DMV falsified a purchase order for approximately $46,000 to pay for services that Tandem Computers, Inc. (Tandem) had provided before the DMV awarded the company a contract and for services that Tandem provided during the contract period, but for which funds had lapsed under the contract to pay for the services.

In June 1989, the DMV contracted with Ernst & Young to provide expert assistance to redevelop the DMV's databases. The DMV and Ernst & Young mutually agreed to terminate the contract effective June 22, 1990. Ernst & Young had several subcontractors assisting on the DBR project. The DMV wanted to retain the services of the subcontractors after the Ernst & Young contract was terminated. Under the terms of the termination agreement, the subcontractors were to be transferred to Tandem. The subcontractors continued their work after the termination of Ernst & Young while the DMV attempted to amend a maintenance contract between the Stephen P. Teale Data Center (data center) and Tandem to include the subcontractors. However, on July 13, 1990, the DGS disapproved the DMV's sole-source request on the basis that it was inappropriate to add consulting services to a maintenance contract.

Therefore, the DMV entered into a contract, effective July 1, 1990, with Tandem to obtain the consulting services of the subcontractors. The contract was approved by the DGS in November 1990. According

to the terms of the contract, Tandem was to provide services from July 1, 1990, to June 30, 1991. The DMV subsequently extended the contract to September 30, 1991. Over one year later, in September 1992, Tandem submitted two invoices requesting payment for consulting services rendered under the contract. However, one of the invoices, for approximately $28,000, was for services performed between June 22, 1990, the termination of the Ernst & Young contract, and July 1, 1990, the start of the Tandem contract. The second invoice, for approximately $18,000, was for services provided in April and June 1991. At the time Tandem submitted the invoices, sufficient funds were not available under the contract to pay for these services. Since the DMV could not pay for these services, together totaling approximately $46,000, from funds encumbered under the contract, it needed to find another source of funds if it was to pay the invoices. Rather than requesting Tandem to submit a claim to the Board of Control, or further amending the contract, the DMV prepared a false purchase order that provided sufficient funds to pay Tandem.

The DMV eventually paid Tandem for these services by falsifying a purchase order for software totaling approximately $46,000. In October 1992, the manager of EDP General Administration approved a request for materials document for the purchase of two packages of Tandem software. Upon the approval of the request for materials document, an information systems analyst within the DMV's EDP Contracts Administration unit prepared and approved a purchase order. After the approval of the purchase order, the DMV processed an invoice requesting payment for two copies of modeling software, matching the description on the falsified purchase order. According to the manager, the DMV did not receive two copies of the modeling software; however, it paid the invoice in December 1992.

According to the EDP Contract Administrator, the DMV paid Tandem in this manner because it would be highly unlikely that DGS would approve a contract amendment so long after the contract had terminated. As a result of this falsified purchase order, the DMV paid approximately $46,000 that it may not have been legally required to pay.

The California Penal Code, Section 424, states that each officer of this State charged with the disbursement of public moneys who, without authority of law, appropriates those moneys to the use of another is punishable by imprisonment in the State prison for two to four years. Additionally, the Government Code, Section 6203, states that officers authorized by law to make or give any certificate or other writing are guilty of a misdemeanor if they make and deliver as true any certificate

or writing containing statements that the officers know to be false. In addition, the State Administrative Manual, Section 1247, requires that amendments or modifications to contracts be approved by the DGS if the original contract required DGS approval.

The DMV Did Not Meet Formal State Requirements for Sole-Source Contracts

The DMV did not always adequately justify its use of sole-source consulting contracts for the DBR project. Specifically, of the four sole-source consulting contracts into which the DMV entered for the DBR project, the DMV did not adequately justify three, entered into from November 1987 to July 1990 and totaling $2.8 million. Additionally, the DGS approved the contracts even though the DMV had not provided adequate justification. The Public Contract Code, Section 12102(a), requires that EDP goods and services be acquired through competitive means, unless the director of the DGS determines that the goods or services are the only ones that can meet the State's need or the immediate acquisition of the goods or services is necessary for the protection of the public health, welfare, or safety. This code section also states that the director of the DGS must approve the acquisition method to be used. The State Administrative Manual, Section 5209, states that the DGS will approve sole-source EDP procurements only when the agency can adequately document the fact that the goods and services are the only ones that can meet the State's needs or that the immediate acquisition is necessary for the protection of the public health, welfare, or safety. This section cites several examples of situations that meet the sole-source criteria. One example is if the agency conducts a survey of the marketplace that shows that only a single vendor can provide the service.

During the course of the DBR project, the DMV entered into four sole-source consulting contracts. We reviewed the DMV's justification for each of these sole-source procurements and found that, for three of the contracts, the DMV failed to adequately justify the need for the sole-source acquisition. These three contracts were with Arthur Andersen, Codd and Date Consulting Group, Inc. (Codd and Date), and Tandem. For example, the DMV awarded a contract and subsequent amendments that ultimately reached a total of approximately $419,000, to Codd and Date. The DMV awarded Codd and Date the initial contract, totaling $125,000, in June 1988, to participate in the development of the operational assessment plan, assist in evaluating the potential vendors, audit the operational assessment for fairness between the two competitors, and review the DMV's prototype plans. The DMV justified the sole-source procurement based on time constraints. Specifically, the DMV stated that it urgently needed to make progress on the design of the new database to maintain the

project schedule. Although other sections of the State Administrative Manual allow the DGS to approve sole-source contracts if the director of DGS determines that it is in the State's best interest to do so, neither the Public Contract Code nor the State Administrative Manual allow this same discretion for sole-source EDP contracts. The State Administrative Manual exclusively specifies the situations that meet the criteria for approval of sole-source EDP contracts, and a time constraint is not one of these situations, outside of a threat to the public health, welfare, or safety. In November 1988, the DMV increased the amount of this contract by approximately $228,000 to conduct the operational assessment and to continue participation in the planning and auditing for fairness between the two competitors for which it had already contracted. The DMV again justified this sole-source procurement based on time constraints. The DMV subsequently increased this sole-source contract to a total of approximately $419,000. Codd and Date subcontracted some its work under this contract to Arthur Andersen, demonstrating that Codd and Date was not the only contractor that could provide these services.

As a result of inappropriately awarding these contracts on a sole-source basis, the DMV and the DGS unnecessarily curtailed competition for state contracts. Such competition is designed to ensure the highest quality of services at the lowest possible price.

The DMV Allowed Work To Be Performed Before DGS Approved Contracts

The DMV entered into ten contracts associated with the DBR project. In four of these contracts, beginning between November 1987 and November 1991, the DMV allowed the contractors to begin work before DGS approved the contract. In fact, the contractors began work on these unapproved contracts as much as five months before the DMV obtained the approval, and the DMV paid all the contractors for the work performed before contract approval once the contracts were approved.

The State Administrative Manual, Section 1209, requires each agency to submit each contract to DGS in enough time to permit DGS to review and comment on it before work commences. Additionally, the State Administrative Manual, Section 1284, states that work under any consulting contract may not be commenced, and no payment may be made, before the contract is approved by DGS, or the DMV, if the contract is exempt from DGS' approval. The State Administrative Manual, Section 1209, also states that, should the contractor begin work in advance of receiving notice the contract is approved, the work may be considered as having been done at the contractor's risk, as if the contractor were a mere volunteer, and the contractor may go unpaid.

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By failing to obtain contract approval before contract work began, the DMV exposed the State to potential monetary liability for work performed when the contract was not approved.

The DMV Failed To Obtain Performance Bonds on Some EDP Contracts

The Public Contract Code, Section 12112, identifies the requirements that a department must satisfy to make progress payments on EDP contracts for goods and services that are manufactured or performed especially for the State and not suitable for sale to others. Specifically, the law requires that a department may make progress payments for work performed under this type of contract if two conditions are met. First, a department must withhold 10 percent of the contract price until final delivery and acceptance of the goods or services, and second, the contractor must submit a "faithful performance" bond in a sum not less than one-half of the total amount payable under the contract. The performance bond secures the contractor's faithful performance of the contract.

During the course of the DBR project, the DGS approved and the DMV entered into seven contracts with progress payments for EDP goods or services that were to be manufactured or performed specifically for the State and would not be suitable for sale to others. The DMV obtained performance bonds for only one of these seven contracts. For example, the DMV entered into a contract with Computer Deductions, Incorporated, in the amount of $1.8 million, for technical support and assistance from Tandem-knowledgeable experts. The contract was for EDP services performed specifically for the State and also provided for progress payments; therefore, the DMV was required by law to obtain a performance bond from the contractor. However, the DMV did not obtain a performance bond from this contractor although the contract allowed for, and the DMV made, progress payments for the contracted services. According to the DGS' Office of Legal Services, if an EDP contract is for goods or services that are to be manufactured or performed specifically for the State and not suitable for sale to others and provides for progress payments, then a performance bond is required. However, the DGS approved these contracts even though the DMV failed to obtain performance bonds.

As a result of failing to obtain performance bonds on contracts that allowed for progress payments, the DMV increased the risk that the State would make payments for services that ultimately were either not delivered or not satisfactory. In this situation, legal action would be the only recourse available to the State to attempt recovery of the payments.

The DMV Modified a Contract Without Obtaining DGS' Approval

During our review of the contracts connected with the DBR project, we found that the DMV authorized Ernst & Young to begin work on a proposed task that was not part of the contractor's approved contract. The approved contract required Ernst & Young to evaluate the DMV's working model prototype and write a report on the validity of the prototype, and the results of the prototype test, defining design issues, high-risk areas, low-risk areas, and providing appropriate recommendations. The estimated cost of this task was approximately $93,000. This task, which was not done, was to evaluate a product required by the Office of Information Technology (OIT) as a basis for OIT's approval of the first feasibility study report. The purpose of the substituted task was to develop and execute the pilot project, and Ernst & Young estimated the cost of completing the task would be approximately $503,000. This task related to a requirement of the second feasibility study report. Although the DMV never obtained the DGS' approval for this modification, the DMV paid Ernst & Young approximately $202,000 for the time spent on this task when the contract was terminated.

The State Administrative Manual, Section 1215, states that all contracts of more than $15,000 are subject to approval by DGS, including contract amendments, except a first amendment that only extends the time for completion of the contract for a period of one year or less.

The Department Had the Authority To Mutually Agree To Terminate Its Contract With Ernst & Young

We reviewed all the deliverables related to the DMV's contract with Ernst & Young because of the unusual circumstances surrounding the contract. The fact that the contract was terminated before it was completed raised concerns about the status of the deliverables at the time of final payment on the contract. In June 1990, the DMV and Ernst & Young mutually agreed to terminate its contract, under which the contractor was to provide expert assistance to the DMV on the DBR project. According to the Legislative Counsel, the DMV had the authority to enter into a termination agreement with Ernst & Young. Additionally, the termination agreement could allow the DMV to pay for partially completed tasks. Therefore, the DMV did not violate any state laws or regulations when it mutually agreed with Ernst & Young to terminate its contract with the contractor and pay for incomplete tasks.

The DMV contracted with Ernst & Young in June 1989 to provide expert assistance to redevelop the DMV's databases. Specifically, among other tasks, the contractor was to assist in the project planning, evaluate the DBR prototype, develop the application development environment, and finalize the database design. The contract, totaling

approximately $5.5 million, was scheduled to end on June 30, 1994. Under the terms of the contract, Ernst & Young was required to provide a performance bond for 50 percent of the contract amount.

On July 2, 1990, the DGS approved the termination of the contract effective June 22, 1990. According to DMV's former chief of EDP, the DMV and Ernst & Young mutually agreed to terminate the contract. Terms of the termination agreement released both parties from any liability and required the DMV to pay the contractor a final settlement of approximately $822,000. The settlement was based on an analysis performed by the DMV related to the amount of work the contractor had performed to date. Including the settlement, the DMV paid Ernst & Young a total of $1.5 million. However, Ernst & Young had submitted invoices for services totaling approximately $2 million to the DMV through May 1990.

Both the DMV and Ernst & Young had concerns about the contract that ultimately resulted in the mutual agreement to terminate the contract. A primary concern to both was that the Ernst & Young contract was predicated on the availability of three integrated computer aided software engineering (CASE) tools. These tools were never fully developed by Ernst & Young to operate in an integrated manner for the Tandem environment. However, certain changes in system software by the DMV and Tandem affected the development of the CASE tools by Ernst & Young and another third-party software company included in Ernst & Young's proposal, raising the question of who was at fault for the tools never being fully developed. The DMV settled the dispute by paying the contractor $370,000 for this task.

Conclusion

The DMV falsified a purchase order for approximately $46,000 to pay Tandem for services that could not be paid from an existing contract. Also, the DMV did not always adequately document its justification for the use of sole-source contracts and allowed contractors to begin work before contracts were approved. Additionally, the DMV and the data center modified contracts without obtaining the DGS' approval. Finally, we found that the DMV properly exercised its authority when it mutually agreed to terminate its contract with Ernst & Young.

The DGS approved three sole-source contracts even though the DMV did not provide adequate documentation. The DGS also approved six contracts that required performance bonds even though the DMV failed to obtain the bonds.

Recommendations   The DMV should follow all contracting laws and regulations to ensure that it protects the State's financial and legal interests and that it obtains the highest quality of services at the lowest possible price. Additionally, the DMV should consider taking disciplinary action against the employees involved in falsifying the purchase order.

We conducted this review under the authority vested in the state auditor by Section 8543 et seq. of the California Government Code and according to generally accepted governmental auditing standards. We limited our review to those areas specified in the audit scope of this report.

Respectfully submitted,

KURT R. SJOBERG
State Auditor

Date: August 17, 1994

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Chronology of Key Events Related to
the Database Redevelopment Project

November 2, 1987	DMV submitted to the Office of Information Technology (OIT) the feasibility study report for Phase I of the Database Redevelopment (DBR) Project.	Estimated project costs: $29,209,908 Estimated completion date: July 1, 1993 Fiscal year 1987-88 $ 672,289 Fiscal years 1988-89 - 1992-93 28,537,619 $29,209,908
December 22, 1987	OIT approved the feasibility study report for DBR - Phase I.	OIT approved DMV to proceed with Phase I of the DBR only. The approved cost for Phase I was $3.4 million.
November 12, 1987	DMV entered into a sole-source contract with Arthur Andersen & Co.	The purpose of the contract was to assist DMV with the planning phase of the DBR. Contract amount: $470,555 Scheduled termination date: June 30, 1989
June 29, 1988	DMV entered into a sole-source contract with Codd & Date Consulting Group.	The purpose of the contract was to provide independent, expert assistance during the planning phase of the operational assessment. Contract amount: $125,000 Scheduled termination date: June 30, 1989
June 30, 1988	DMV entered into amendment #1 to the contract between DMV and Arthur Andersen.	The amendment increased the contract amount by $172,564, to a total of $643,119, and added four tasks to the contract.
November 1, 1988	DMV entered into amendment #1 to the contract between Codd & Date and DMV.	The amendment increased the amount of the contract by $227,550, to a total of $352,550, and added the task of assisting DMV in the operational assessment of IBM and Tandem.
November 8, 1988	DMV submitted to the OIT the feasibility study report for Phase II of the DBR.	Estimates costs of $13,240,793 to complete driver's license pilot by August 1990.
December 15, 1988	OIT approved the feasibility study report for DBR - Phase II.	OIT approved the continuation of DBR into Phase II, but instructed DMV not to proceed with Phase II until the OIT approved the Phase I technological demonstration evaluation.

December 23, 1988	DMV released the results of the operational assessment.	As a result of the operational assessment, the DMV selected Tandem's NonStop SQL as its database management system.
March 15, 1989	DMV entered into amendment #2 to the contract between Codd & Date and DMV.	The amendment increased the amount of the contract by $66,000, to a total of $418,550, and added the task of reviewing the proposals received in response to a second request for information.
April 6, 1989	OIT approved the Phase I technological demonstration evaluation.	OIT accepted the operational assessment as meeting the OIT's requirement for a technological demonstration as stated in the December 15, 1988 approval of the Phase II feasibility study report.
May 16, 1989	Teale Data Center (data center) initiated the purchase order for the Tandem VLX+CLX application development systems.	Cost of the system is $6.5 million.
June 13, 1989	DMV entered into a contract with Arthur Young (later Ernst & Young).	The purpose of the contract was to provide independent, expert assistance to redevelop the driver's license, vehicle registration, and occupational license databases. Amount of contract: $5,455,154 Scheduled termination date: June 30, 1994 Procurement process: RFP DMV-8030
October 16, 1989	DMV entered into amendment #1 to the contract between Arthur Young and DMV.	The amendment changed the name of the contractor from Arthur Young to Ernst and Young.
October 20, 1989	DMV submitted a major project report to the OIT.	Project schedule was delayed four months because of the bid protest.
December 4, 1989	OIT returned the October major project report.	The OIT stated that the "project report ... fails to provide the specific information needed to evaluate the status of the project."
April 6, 1990	DMV submitted the special project report for DBR-Phase II to the OIT.	Project schedule delayed for two reasons: an unanticipated request for information process conducted by DGS at the conclusion of the operational assessment and the protest of the contract award to Ernst and Young. Estimated completion date: January 1995

May 7, 1990	DMV entered into a contract with Computer Deductions, Inc.	The purpose of the contract was to provide the independent, expert assistance of a single, senior-level individual. The contract was exempt from DGS review under DMV's delegated authority. Contract amount: $296,809 Scheduled termination date: June 30, 1992 Procurement process: RFP DMV-88-165
June 6, 1990	OIT rejected the April special project report.	OIT returned the April 1990 special project report to DMV citing the following problems: (1) the special project report did not accurately represent the current project status; (2) the report did not demonstrate that the project would produce economic benefits commensurate with the costs; (3) the actual project is significantly different from the documented and approved pilot project; and (4) DMV failed to accomplish the pilot, yet began major work on the full production system.
June 14, 1990	DMV entered into contract amendment #2 with Ernst and Young.	By mutual agreement, effective June 22, 1990, the amendment terminates the contract, lowers the contract amount to $1,500,000, and transfers certain Ernst and Young subcontractors to Tandem so they can continue to work on the project.
July 1, 1990	DMV entered into a sole-source contract with Tandem.	The purpose of the contract was to provide technical support services including technical project leadership; design and construction of the application development environment; application design and development; and technical support in designing, testing, and converting the applications and databases. Contract amount: $700,000 Scheduled termination date: June 30, 1991
July 18, 1990	DMV submitted a revision of the April 6, 1990 special project report to the OIT.	The OIT did not respond to this special project report in writing.

September 14, 1990	DMV submitted a revision to the July 18, 1990 special project report for DBR to the OIT.	This special project report replaces the July 18 report. The report states that DMV planned to put the relational database technology, running on Tandem's NonStop SQL, into production in fiscal year 1990-91. DMV reported that the driver's license pilot was completed in August 1990.
		Total project costs to date: $8,433,155
		Estimated project costs: $31,418,900
		Estimated completion date: January 1995
November 30, 1990	OIT approved the September 1990 special project report.	OIT's analysis indicates an estimated net benefit of $2,597,000 by 1998-99 and subsequent net annual savings of $8,888,000. The OIT approved the purchase of up to six Cyclones.
December 21, 1990	DMV entered into amendment #1 to the contract with Computer Deductions, Inc.	The amendment increased the contract amount by $135,368, to a total of $432,177, and expanded the role of the consultant in the area of project planning and development of DBR.
December 27, 1990	The data center submitted a purchase order for six Cyclones. The computers were accepted in February 1991.	The total cost is $11.9 million.
January 9, 1991	DMV entered into amendment #1 to the contract between Tandem and DMV.	The amendment increased the contract amount by $700,000, to a total of $1,400,000.
February 25, 1991	The Department of Finance's Program Evaluation Unit published the final report on the compliance review of the DBR.	The findings include: (1) Many of the products developed in Phase I were not used; (2) The Phase I prototype activities did not demonstrate the expected performance and benefits of the proposed new system; (3) DMV underreported the costs of Phase I; (4) DMV intends to place the Driver's License system into production without completing a pilot to estimate costs and benefits; (5) The project is not proceeding on schedule because of unforeseen project activities; (6) DMV is spending more than the OIT-approved spending levels for the project; and (7) Project reporting has not been prepared

		according to State Administrative Manual standards.

May 15, 1991	DMV entered into amendment #2 to the contract between Tandem and DMV.	The amendment increased the amount of the contract by $300,000, to $1,700,000, and extended the scheduled termination date to September 30, 1991.
August 9, 1991	DMV submitted a major project report to the OIT.	DMV reported many of the problems they were experiencing with the project. Estimated completion date: July1995
August 20, 1991	DMV entered into contracts with the three contractors listed below. Computer Deductions, Inc. Zen Systems, Inc. Fitech	The purpose of each contract was to provide technical support services. The procurement process for all three contracts was RFP DMV-1003. Contract amount: $1,802,400 Scheduled termination date: August 20, 1995 Contract amount: $754,000 Scheduled termination date: August 20, 1995 Contract amount: $191,000 Scheduled termination date: August 20, 1995
October 7, 1991	The DMV director sent a letter to Tandem Integrated Engineering Services (TIES).	This letter states that DMV accepts the TIES proposal for a review of the DBR project.
November 1, 1991,	DMV entered into a contract with Texas Instruments.	The purpose of the contract was to provide training for the use of software purchased from the contractor and use of contractor hardware and software. Contract amount: $1,127,079 Scheduled termination date: March 23, 1995
October 14, 1992	DMV submitted a major project report to the OIT.	Estimated development costs: $57,300,000 Estimated completion date: December 31, 1998
January 28, 1993	The DMV director sent a letter to the data center.	The director accepted the data center's offer to make a proposal regarding the DBR project.
March 17, 1993	Tandem sent a letter to the DMV director regarding Tandem's approach to developing a new DBR plan.	In this letter, Tandem documents its plan to bring in Electronic Data Systems as a project partner and to keep the project "within budget limits" and guarantee deliverables within the defined implementation period.
March 29, 1993	The DMV director sent a memorandum to the Secretary of the	In this memorandum, the director documents the DMV's decision to reject the data center's

	Business, Transportation and Housing Agency.	proposal because there was insufficient information upon which to base a decision of this magnitude.

November 1, 1993	Tandem and Electronic Data Systems submitted cost information for the proposed new DBR project plan.	The estimated cost to implement the new plan is $185 million.
December 31, 1993	The DMV director informed Tandem that DMV would not accept its proposal.	DMV cited the following reasons for not accepting the proposal: • Total project costs have increased from $28.5 million to $185 million ($175 million proposal ceiling plus $10 million DMV costs). • Project time frames and target dates have increased from the original five years with project completion expected in 1993 to ten years with an estimated completion date in 1997-98. • DMV's Information Technology planning has been expanded to a global architectural view encompassing front-end systems replacement. • DMV's business requirements have and are rapidly changing which necessitates initiation of major business reengineering efforts. Completion of these prerequisite efforts is not consistent with the time frames, milestones, and contractual obligations proposed in the new DBR project proposal.
April 4, 1994	DMV submitted a special project report to the OIT.	This report concludes that the DBR failed because the decisions that DMV made as a result of the operational assessment were erroneous. It also concludes that the revitalization proposal made by Tandem and Electronic Data Systems did not support DMV's total business agenda and that the proposal's benefits could not justify its cost.

Responsible Officials

Department of Motor Vehicles

Director
Del Pierce	February 1986 - January 1991
Frank Zolin	March 1991 - present

Chief of Electronic Data Processing Services
Jack Miller	December 1985 - February 1988
Don Leachman	March 1988 - April 1993
Margie Mullen (Acting)	May 1993 - present

Database Redevelopment Project Director
Dennis Walker	June 1986 - March 1989
Margie Mullen (Acting)	April 1989 - June 1989
Margie Mullen	July 1989 - April 1993
Glenn Wilson	May 1993 - present

Stephen P. Teale Data Center

Director
David Lema	July 1988- June 1989
Jim Wilson (Acting)	July 1989 - May 1991
Bob Dell'Agostino	May 1991 - September 1991
Chong Ha	September 1991 - present

Assistant Director of Information Processing Systems
Don Leachman	May 1993 - present

Assistant Director of Enterprise Systems
Tim Wenger	February 1993 - present

Department of Finance, Office of Information Technology

Director
Steven Kolodney	March 1983 - September 1989
Ronald Kuhnel (Acting)	September 1989 - March 1991
Steven Kolodney	April 1991 - April 1994
Vacant	April 1994 - present

Chief of Statewide Oversight
Tim Wenger	January 1985 - February 1993

Appendix C   Description of Technological Elements of the Proposed Database Redevelopment System

Relational Database Management System A key component of the Database Redevelopment (DBR) project was the use of a relational database management system. Based on the Department of Motor Vehicle's (DMV) expectation that more and more demands would be placed on the computer system by outside parties (for example, law enforcement agencies and insurance companies), the DMV chose relational database technology because it allows greater flexibility in modifying existing computer programs and existing computer files. The DMV currently uses a nonrelational database to store information. A key difference between relational and nonrelational databases is the organization of the data. A relational database management system stores information in tables (rows and columns of data). For example, information about a specific driver would be stored in several tables with a driver's name and address stored in one table, vehicles owned in a separate table, and moving violations in another. The system matches the driver in the "driver" table to that driver's traffic violations in the "traffic violations" table. In a nonrelational database, all related information (for instance, all information about a particular driver) is stored in one location or "record." For example, in the driver's license database, each record contains specific information about one driver, such as name, address, driver's license number, traffic violations, and accidents. This type of database system is called a "flat file" database.

A relational database allows an item of data, such as a person's name, to be stored only once, which reduces inconsistencies in the data. In addition, it allows unlimited, efficient growth in the database. It also makes it easier and faster to extract specific, limited information from the database. For example, if a law enforcement agency wanted a report that lists all the drivers who live at a particular address, the computer would only have to search the address table. Under the old system, the computer would have to search the entirety of every record to produce the same report.

However, in a relational database management system, it takes longer to assemble the entire record for one driver. Those transactions that require the entire record will take much longer to process under the new system because it must search all the tables in the database to extract the entire record on one driver. This is significant because under the DMV's proposed system, the way in which the end users accessed the data and viewed the information would not have changed. This concept is known as "transparency."

Transparency In the initial planning phase of the DBR project, the DMV made a decision not to review or change the end user's business processes. This decision resulted in the need to change the system in a way that the system's users would not be affected by the changes and would, therefore, not be required to change their business processes. The concept of changing the system without any noticeable effect on the system's users is known as "transparency."

The DMV's databases support the activities of both DMV and external clients, such as law enforcement agencies and insurance companies. The primary focus of the DBR project was on improving the storage and retrieval of information necessary to fulfill existing program requirements, mandated new functions, the DMV's vision, and the timely delivery of information to the DMV's clients. Secondarily, the DBR project was intended to increase the efficiency of developing and maintaining the computer programs that perform all functions of the DMV's computer system. According to the current DMV Manager of Information Systems, the DMV originally determined that it was not feasible to review or change the business processes of the system's internal and external users.

According to the manager, most end users are given all the information about a particular driver when they make inquiries or update a record. Therefore, under the proposed relational database system, each time a request for data was made, each table would have to be accessed to compile all the same information about a driver that an end user was accustomed to seeing. As a result, the amount of time required to process each transaction would significantly increase.

This transparency concept affected the success of the DBR project because the DMV failed to analyze the ability of the proposed new technology to process transactions using the existing business processes developed over the last 25 years. As noted previously, relational databases are more efficient than the existing flat file databases at relating specific items of information, but they are less efficient at pulling or searching for an entire record. Because many of the system users' business processes called for pulling the entire record and these processes were not going to be changed, the average processing time per transaction increased in the new system.

CASE Tools In addition to improving information storage and retrieval capability, the DMV desired to update its 25-year-old computer programs and improve the efficiency of developing new software programs and maintaining existing ones. The DMV planned to accomplish this objective through the use of computer-aided software engineering (CASE) tools. CASE tools assist in the development of new software programs. Among other things, CASE tools can be used to help transition computer programs from one programming language to another.

The DMV anticipated that the use of CASE tools would allow it to more easily and quickly convert its 25-year-old software programs to the new programming language. Without CASE tools, the only way to write software programs is by manually rewriting the code in the new language.

Transitional In the planning phase, the DMV analyzed two alternative plans for implementing the new **Architecture** system: the phased approach and the slash or cutover approach. In the phased approach, which was selected by the DMV, the software programs that access, update, and manipulate the data are translated to the new programming language, transferred to the new computer system, and implemented in several steps over time. In the slash or cutover approach, the new system is implemented and run in parallel with the old system until a conversion to the new system is completed.

The selection of the phased approach created the need to develop additional, temporary computer systems and programs that would allow both the old and the new computers to communicate with all computer users. This transitional system, referred to as the "transitional architecture,"

between the old IBM system and the new Tandem Computers, Inc. (Tandem) system, two very different hardware systems, significantly increased the technical problems experienced during the conversion.   This phased implementation approach with transitional computer systems is not uncommon for system conversions of DMV's magnitude; however, its use significantly increases the overall complexity of the conversion.

The DMV determined that the slash or cutover approach represented too great a risk that the new system would fail and cause the databases to be unavailable.   The DMV reasoned that this approach was unacceptable because of the tremendous detrimental impact this would have on the DMV's law enforcement clients and the public.   The DMV selected the phased approach because it believed it to be less risky.   The DMV identified two objectives of the phased approach: to reduce the risk of disrupting services to users and to gradually introduce the new technology to the DMV's technical staff.

Unreported Expenditures for the DBR Project
(In Thousands)

| | | | | | Fiscal Year | | | | | |
	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	Total
Reported Expenditures Per 1994 Special Project Report										
DMV staff		$ 770	$1,828	$1,920	$ 1,984	$2,301	$1,407			$10,210
Consultants	$471	557	1,567	1,582	972	827	714			6,690
Other DMV costs		364	1,064	203	756	377	208			2,972
Data center costs										
Equipment			970	1,570	3,439	3,439	3,278	$2,384	$2,384	17,464
Other			876	996	1,684	1,663	1,734			6,953
Total Reported	471	1,691	6,305	6,271	8,835	8,607	7,341	2,384	2,384	44,289
Unreported Expenditures										
DMV staff	249	(5)	(184)	(173)	971	912	630			2,400
Consultants		(15)	(4)	(23)	1,210	62	341			1,571
Other DMV costs										
Data center costs										
Equipment		217	329	329	330	330	275	86	(943)	953
Other		155	585	374	(285)	(340)	(313)			176
Total Unreported	249	352	726	507	2,226	964	933	86	(943)	5,100
Actual Expenditures Per DMV and Data center Documentation										
DMV staff	249	765	1,644	1,747	2,955	3,213	2,037			12,610
Consultants	471	542	1,563	1,559	2,182	889	1,055			8,261
Other DMV costs		364	1,064	203	756	377	208			2,972
Data center costs										
Equipment		217	1,299	1,899	3,769	3,769	3,553	2,470	1,441	18,417
Other		155	1,461	1,370	1,399	1,323	1,421			7,129
Total Actual	**$720**	**$2,043**	**$7,031**	**$6,778**	**$11,061**	**$9,571**	**$8,274**	**$2,470**	**$1,441**	**$49,389**

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