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# Key Points of Report

## **An Audit Report on the Comptroller of Public Accounts Integrated Tax System**

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March 2000

### **Overall Conclusion**

The Integrated Tax System's controls ensure safeguarding of relevant state assets and correct reporting of tax revenues. The implementation of the Integrated Tax System, which began in 1996, has made the Comptroller of Public Accounts (Comptroller) tax function more efficient and effective. Although the State gained additional revenues during fiscal years 1996 and 1997, management cannot ensure that the Integrated Tax System has met the requirements of a General Appropriations Act rider stipulating that \$225 million in revenue increases be achieved as a result of the re-engineering efforts.

Many qualitative improvements were realized as a result of the Integrated Tax System. However, the inability to tie re-engineering efforts to efficiency gains is indicative of a larger state problem. Changes in system development methodologies throughout the State could help ensure the cost-effectiveness of future system development efforts.

### **Key Facts and Findings**

- The Integrated Tax System's controls ensure that relevant state assets are safeguarded and that tax revenues are correctly reported. The Integrated Tax System has also increased the efficiency and effectiveness of the Comptroller's tax function.
- The Comptroller certified an additional \$225 million in revenue during the 1996 - 1997 biennium as available in the revenue estimate it provided to the 74th Legislature. The Legislature funded the Integrated Tax System with an expectation of efficiency gains of at least this amount from the new system. However, the Comptroller is not able to clearly distinguish between revenue gains resulting from technology, as required by the General Appropriations Act rider, and those resulting from an improving economy.
- Improvement of agency and state controls over system development could help ensure the cost-effectiveness of future automated systems. Effective controls could also reduce risks related to system functionality and security.

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*This audit was conducted in accordance with Government Code, Sections 321.0131, 321.0132, and 321.0133.*

# Executive Summary

The Integrated Tax System's controls ensure safeguarding of relevant state assets and correct reporting of tax revenues. The implementation of the Integrated Tax System, which began in 1996, has made the Comptroller of Public Accounts' (Comptroller) tax function more efficient and effective. Although the State gained additional revenues in excess of \$225 million, management cannot ensure that this project has met the requirements of a General Appropriations Act rider stipulating that specific revenue increases be achieved as a

result of the re-engineering efforts.

Many qualitative improvements were recognized as a result of the Integrated Tax System (see text box). However, the inability to tie re-engineering efforts to efficiency gains is indicative of a larger state problem. Changes in system development methodologies throughout the State could help ensure the cost-effectiveness of future system development efforts.

For example, management could have measured levels of effort for key tax functions before and after installation of the Integrated Tax System. This data would have provided information on the Integrated Tax System's effect on costs.

In addition to being unable to tell whether the Integrated Tax System will provide a net financial benefit, management

cannot determine whether the Integrated Tax System has achieved the following financial goals:

- **Goal 1: Increase revenue to the General Revenue Fund by \$225 million during fiscal years 1996 and 1997.** A rider in the General Appropriations Act for the 1996-1997 biennium required management to certify that re-engineering its tax systems, including implementing the Integrated Tax System, would create efficiencies resulting in this revenue increase. Although tax revenues increased by more than \$225 million during fiscal years 1996 and 1997, management cannot determine how much of this increase, if any, is due to re-engineering.
- **Goal 2: Increase tax auditor efficiency to compensate for revenue losses resulting from staff shortages.** An audit finding relating to recovery of tax revenues through audit adjustments noted that management could increase revenues by increasing its tax auditor workforce to the optimum staffing level. Management stated in its response that it was relying on Integrated Tax System-related productivity increases to compensate for the effects of this staffing shortage. Although net audit adjustments have increased, management cannot determine how much, if any, of this increase is due to improved productivity.

Improvement of agency and state controls over system development can help ensure the cost-effectiveness of future automated systems. Effective controls can also reduce risks related to system functionality and security. Strong system development controls could have prevented or corrected weaknesses in the Integrated Tax System's access controls, which existed during system development. These weaknesses were in the areas of network security, programming change control, and access monitoring. The current administration recognized and began

## Qualitative Improvements

The Integrated Tax System's controls safeguard state assets and ensure that tax revenues are correctly reported. Additionally, the Integrated Tax System has made the Comptroller's tax function more efficient and effective by adding some qualitative benefits including:

- Making the system more user-friendly than the previous systems by reducing system and operating complexity
- Increasing information accessibility through an improved reporting function
- Making information more current due to conversion from batch processing to online updating of tax data

Examples of the effect of these benefits include:

- The time needed to implement new taxes and legislative changes has been reduced. For example, three small taxes were added during the audit period. In addition, management has reported that the Franchise Tax, with over 600,000 taxpayers, was successfully converted to the Integrated Tax System over a three-day weekend with no user downtime.
- Reduced system and operating complexity have enabled management to reduce the variety of skills its programmers need. This reduction in necessary job skills has made it easier for management to train more staff to access larger amounts of information.

# Executive Summary

corrective measures for the majority of the security findings independent of this audit.

The Comptroller should implement the following improvements over its system development to increase the likelihood of creating cost-effective systems in the future:

- Require all projects to complete a comprehensive needs analysis to ensure new automation systems are cost-effective and meet user needs.
- Increase system documentation requirements to ensure the organization can continue to service the system effectively, even if key personnel leave.
- Mandate and formalize key system development processes to ensure they are performed in a uniform, correct manner.
- Significantly involve the Internal Audit Department in system development to detect and correct problems quickly.

## Summary of Comptroller's Responses

*The Integrated Tax System has successfully improved the effectiveness of tax administration within the Comptroller's Office, protecting tax revenue, safeguarding state assets, and ensuring that revenues are accurately reported. Funding for the Integrated Tax System was obtained based on a revenue certification, which was achieved.*

*The list of qualitative improvements to the Comptroller's tax functions is extensive and significant. The Integrated Tax System has enabled the Comptroller's Office to provide services to more taxpayers and process more tax revenue, despite using fewer employees for tax-related functions. As a part of on-going improvements in agency processes and functions, the current*

*administration identified issues in the areas of LAN security and began correcting them prior to the initiation of this audit. However, LAN security issues are in no way related to the security of the Integrated Tax System, which is protected by strong controls over the mainframe system on which it resides.*

*The Integrated Tax System's development methodology has been successfully used for multiple implementations. The Comptroller's Office is always looking for more efficient ways to perform business processes, and we will continue efforts to improve our system development methodology. Currently, the Comptroller's Office is participating in a pilot project with the State Auditor's Office to investigate use of the Capability Maturity Model as a framework for use in developing better and cheaper software applications.*

*The Integrated Tax System has been a successful project to improve tax administration from both a business and technical perspective.*

## Summary of Quality Assurance Team's Responses

*The Quality Assurance Team recommends that agencies institute controls and repeatable processes for development of automated systems. While the Quality Assurance Team is an outside oversight entity, the agency management is responsible for the successful implementation of projects and should use all tools and processes feasible to ensure the best use of state resources.*

# Executive Summary

## **Summary of Objective, Scope, and Methodology**

The State Auditor's Office examined application controls over the Integrated Tax System and general controls that had a significant effect on the Integrated Tax System's ability to safeguard assets and

accurately report tax revenues. In addition, we determined whether implementation of the Integrated Tax System resolved key issues from prior audit reports issued by the State Auditor's Office. We also examined whether management had achieved key planned efficiencies without significantly decreasing organizational effectiveness.

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Section 1:

## Management Cannot Determine Whether the Integrated Tax System Will Repay Its Costs, Despite Improving Efficiency

The Integrated Tax System protects tax revenues by ensuring that relevant state assets are safeguarded and tax revenues are correctly reported. The Integrated Tax System has also increased the efficiency and effectiveness of the Comptroller of Public Accounts' (Comptroller) tax function. However, the Comptroller cannot tell if the Integrated Tax System's benefits will repay the estimated \$41.7 million in development costs and estimated \$4.8 million in annual operating costs. Management also cannot determine whether the Integrated Tax System accomplished key goals because management did not plan for or put in place processes to measure the related efficiencies. For example, management could have measured levels of effort for key tax functions before and after installation of the Integrated Tax System. This data would have provided information on the Integrated Tax System's effect on costs.

Although Comptroller management may not have been notified, the Quality Assurance Team provided early warning to key project personnel that measuring the Integrated Tax System's success would be difficult without measurement processes. At that time, the Quality Assurance Team was made up of staff members from the Department of Information Resources and the State Auditor's Office.

Section 1-A:

### The Integrated Tax System Adds Some Significant Qualitative Improvements to the Comptroller's Tax Function

The Integrated Tax System's controls safeguard relevant state assets and ensure that tax revenues are correctly reported. The Integrated Tax System now supports over 40 different taxes and fees in a consolidated database with integrated batch and online processing. The Integrated Tax System has also increased the efficiency and effectiveness of the Comptroller's tax function by adding several qualitative improvements over the previous organization of multiple tax systems. The most significant of these improvements include:

- **Operation of the Integrated Tax System is less complex than previous systems.** Prior to the Integrated Tax System, the Comptroller administered taxes through 11 major automated tax systems and numerous system interfaces. These systems had different database structures and operating methodologies. The various structures, some of which were extremely inefficient, made creating any report or automated application using multiple tax systems difficult. The operating methodologies differed enough for employees to have to be trained to use each system. In addition, each tax had its own business rules. As a result, changes in the law that affected multiple taxes in the same way had to be treated differently in each system.

The Integrated Tax System has corrected these inefficiencies for all taxes that have been moved from the older systems. The database structure for



all taxes in the Integrated Tax System is now the same. Users can access all Integrated Tax System taxes from the same program which works the same way for all taxes. Therefore, Integrated Tax System users need to be trained for just one system. As a result, management has been able to reduce the variety of technical skills its programmers need. This reduction in necessary job skills has made it easier for management to train more staff members to access larger amounts of information.

Reduced system complexity has also reduced the time needed to implement new taxes and legislative changes. For example, three small taxes were added during the audit period. In addition, management has reported that the Franchise Tax, with over 600,000 taxpayers, was successfully converted to the Integrated Tax System over a three-day weekend with no user downtime.

- **An improved reporting function makes information more accessible.** With the Integrated Tax System, users can generate custom-designed reports in a matter of minutes to meet their specific information needs. The older systems required that reports be programmed, which could be a lengthy process. Increased access to information helps management make better-informed decisions regarding tax policy.
- **The conversion from batch processing to online updating of tax data makes current information available immediately.** Online updating of tax information helps ensure that the tax data available to Comptroller staff is up-to-date. This change improves the Comptroller's ability to give taxpayers faster access to the most accurate information. Prior to the Integrated Tax System, because of the batch processing system, there was a delay between the notification of a need for updating information and the posting of the updated information on a taxpayer's account. During the delay, the new information would not be available to other system users creating confusion.

For example, account representatives can now change an address and update a phone number while talking to a taxpayer. Anyone accessing the account can immediately see what action occurred, who initiated the action, and comments on why the action was taken. Allowing for online update capability has significantly reduced or eliminated the need to monitor overnight batch transactions.

- **The integrated data structure makes it easier to recover unpaid taxes.** The integrated data structure makes it easier to create programs that will cross-match tax data with data outside the Integrated Tax System. Cross-matching helps identify persons not filing all required tax returns. This cross-matching attribute was originally supposed to be part of the Integrated Tax System. However, this capability was developed in a separate application, the Advanced Database System, by an outside contractor for a percentage of the additional tax revenue identified by the Advanced Database System. However, the estimated cost of the Integrated Tax System was not reduced to reflect moving this function to another application. The Legislature approved this

arrangement with Senate Bill 461, 75<sup>th</sup> Legislature. As a result of the Advanced Database System, the State has collected an estimated \$55.6 million as of August 1999 and has paid the vendor \$4 million.

- **Workers have an online help system.** This system gives details on error messages and other information if staff members are unfamiliar with certain screens.

Section 1-B:

**Management Did Not Create Processes to Measure the Integrated Tax System's Achievement of Key Goals**

Despite the improvements discussed in Section 1-A, management cannot tell if the Integrated Tax System's benefits will repay its estimated \$41.7 million in development costs and estimated \$4.8 million in annual operating costs. Because management has not captured critical performance data, it cannot determine whether the Integrated Tax System has provided a net benefit to the State. In addition, management cannot determine whether the Integrated Tax System has accomplished critical financial goals, one of which was used to justify continued funding of development of the Integrated Tax System.

As shown in Table 1, the Integrated Tax System's estimated development and operating costs are significant and have grown over time. System development and maintenance costs should be weighed against the benefits created by a new system during the development of the system. In the case of the Integrated Tax System, management cannot determine whether it will create a net benefit to the State because management is unable to measure the net benefit.

Table 1

<b>Estimated Costs of the Integrated Tax System (dollar figures are in millions)</b>				
<b>Date of Estimate</b>	<b>Estimated Project Life Cycle Costs <sup>a</sup></b>	<b>Estimated Average Annual Operating Costs</b>	<b>Average Ongoing Information Resource Full-Time Equivalent Employees</b>	<b>Estimated End Date <sup>b</sup></b>
October 1995	\$30.0	\$2.0	29	9/31/98
November 1997	\$41.7	\$4.8	47	8/31/01

<sup>a</sup> The November 1997 costs include costs for an imaging component of the Integrated Tax System, which explains some of the cost difference.

<sup>b</sup> Management considers the Integrated Tax System to have been completed in August 1998. However, several additional taxes, such as the Franchise Tax, were scheduled to be added to the Integrated Tax System after August 1998.

Source: The Comptroller's Biennial Operating Plans for Fiscal Years 1996-1999 and Fiscal Years 1998-2001

Lack of financial data also hinders management's ability to fulfill commitments it made to justify funding the creation of a new automated system. During the development of the Integrated Tax System, management made these commitments through agreeing to financial goals in budgetary documents and audit reports. Management cannot determine whether the Integrated Tax System has achieved the following financial goals:

- **Goal 1: Increase revenue to the General Revenue Fund by \$225 million during fiscal years 1996 and 1997.** A rider in the General Appropriations Act for the 1996-1997 biennium required management to certify that re-engineering its tax systems, including implementing the Integrated Tax System, would create efficiencies resulting in this revenue increase. The revenue increase was to “occur as a result of the efficiencies realized through the re-engineering of the Comptroller’s tax systems.” This certification was required for the Comptroller’s Office to receive \$11.2 million in funding for the second phase of the Integrated Tax System.

Although the specific tax revenues that management claims achieved the Integrated Tax System-related gain increased by \$3.5 billion during the biennium, it is impossible to determine how much, if any, of this increase is due to re-engineering. Separating the effects of reorganization from other factors that would increase tax revenues, such as an increase in economy strength, would have allowed management to quantify the Integrated Tax System’s benefit and calculate its payback.

- **Goal 2: Increase tax auditor efficiency to compensate for revenue losses resulting from staff shortages.** An audit finding<sup>1</sup> relating to recovery of tax revenues through audit adjustments noted that management could increase revenues by increasing its tax auditor workforce. At the time of the report, management employed 485 tax auditors, which was 12 percent below the optimum staffing level of 550 tax auditors. Management increased the staff from 485 auditors to 515 by the time of the follow-up audit.<sup>2</sup> Management stated in its responses to the audit reports that it was relying on Integrated Tax System-related productivity increases to compensate for the effects of this staffing shortage. Although net audit adjustments have increased \$28.3 million, management cannot determine how much, if any, of this increase is due to improved productivity. The tax audit function may actually be more or less effective than perceived by management.
- **Goal 3: Produce and use key performance data to manage the audit function.** One of the other recommendations in *An Audit Report on the Comptroller’s Tax Revenue Management Process* (SAO Report No. 95-030) was that management use certain performance measures to help manage resources in the Revenue Audit Function. The report stated that these performance measures (actual collections from audits and percentage of penalties waived) would help identify when staffing changes were needed in the Comptroller’s audit field offices and when changes had been beneficial. In the follow-up audit (SAO Report No. 97-016), management stated that it was relying on the Integrated

<sup>1</sup> The finding appeared in SAO Report No. 95-030, *An Audit Report on the Comptroller’s Tax Revenue Management Process*. This finding was based in part on a Texas Performance Review recommendation, which appeared in the report *Breaking the Mold*. In that recommendation the Texas Performance Review estimated that the Comptroller’s Office could increase the General Revenue Fund by \$19.7 million from 1992 to 1996 by adding 50 tax auditors.

<sup>2</sup> SAO Report No. 97-016, *A Management Letter on the Tax Revenue System at the Comptroller of Public Accounts*, November 1996

Tax System to provide the necessary information. Management began to use the Integrated Tax System to produce this information during our fieldwork. Management should continue to monitor data from the Integrated Tax Systems to determine if changes in staffing are beneficial.

Recommendation:

In the future, management should capture data that will help it make informed financial decisions and measure the success of all its key projects. Management should identify key cost/benefit measures at the beginning of development of future automated systems. Information management should collect includes:

- Data necessary to measure the financial benefit gained from efficiencies instituted through the new system
- Information needed to determine whether the project followed legal requirements, such as appropriation riders
- Information necessary to determine whether the project achieved important planned objectives, such as resolving prior audit findings
- Other pertinent data to measure whether the project was successful

It is too late to efficiently implement such measures for the Integrated Tax System. However, management should use the newly available data, actual collections from audits, and the percentage of penalties waived to determine whether this data is useful in managing operations.

Comptroller's Response:

*The Integrated Tax System was justified and received funding from the Legislature based on one single financial benefit, increased revenue. The Comptroller of Public Accounts was required to certify to the Legislature that the revenue increases would be achieved, and in fact this did occur. In addition, the original budget request for ITS was decreased to \$11.2 million, even though the revenue projections remained the same. Management's sole measure of the success of ITS in financial terms was whether, over the biennium, the revenue increase did in fact occur. Management had measures to track revenue increases. The CPA has tracked revenue very successfully for years.*

*Additionally, the estimated annual operating costs do not take into consideration costs which would have been necessary to maintain the multiple systems and databases which ITS replaced. They do not consider the costs which would have been incurred to develop additional systems to support new taxes which can now be quickly and easily implemented within ITS. There was also no mention of what Y2K*

remediation costs were avoided by consolidating taxes into ITS rather than fixing the original stovepipe tax systems.

We believe that the following statistics (see Table 2) demonstrate that we are managing more taxpayers and, collecting more tax revenues with less personnel, thus showing that efficiencies were gained through ITS:

Table 2

Category	FY 1994	FY 1999	Percent Change
Sales Tax Revenue	\$9,810,089,853	\$13,069,131,458	33 %
Franchise Tax Revenue	\$1,260,748,953	\$2,077,633,059	64 %
Delinquent Sales tax Collections	\$348,951,984	\$394,228,362	12 %
Delinquent Franchise tax Collections	\$52,090,825	\$98,858,861	89 %
No. of Sales Taxpayers	575,180	610,775	6 %
No. of Franchise Taxpayers	334,866	404,050	20 %
Avg. No. of FTEs in Audit	669.4	605.3	- 9.6 %
Avg. No. of FTEs in Enforcement	408.7	388.3	- 5.0 %
Avg. No. of FTEs in Revenue Administration	459.2	439.6 <sup>a</sup>	- 4 %

<sup>a</sup> In fiscal 1997, the Unclaimed Property function was acquired by Revenue Administration due to the merger of the State Treasury with the Comptroller's office, resulting in an increase of 37 FTEs. We have subtracted these 37 FTEs from the 1999 total.

Auditor's Follow-Up Comment:

The State Auditor's Office agrees that the Integrated Tax System has benefitted the Comptroller's tax function. However, ensuring that the implementation of new automated systems creates more benefits than costs—and that the benefits meet all funding requirements—is a basic management best practice.

Comptroller management cannot determine whether the Integrated Tax System's benefits will repay its costs because management did not create measurement processes for key benefits. To isolate and measure the benefits of new automated systems, the measurement processes must be developed during system design. Otherwise, factors may make measuring the benefits of system implementation difficult or impossible.

For example, management cites a greater sales tax revenue increase than projected between the 1994-1995 biennium and the 1996-1997 biennium as part of its evidence that the Integrated Tax System achieved the revenue increase discussed in Goal 1. However, Table 3 reveals that the percentage increase in Texas retail sales during that biennium was greater than the percentage increase in tax revenues. Because the Comptroller did not specifically determine how the Integrated Tax System increased sales tax revenue or measure the effect of this specific cause, it is impossible to determine what effect, if any, the Integrated Tax System had on tax revenues as opposed to other factors such as a strong economy.

Table 3

Comparison of Growth in Texas Retail Sales and Sales Tax Revenues (all dollar figures are in billions)				
Biennium	Texas Retail Sales	Increase	Sales Tax Revenues	Increase
1994-1995	\$383.8		\$20.0	
1996-1997	\$450.4	17.4%	\$22.1	10.3%

Source: Texas Retail Sales Data is from Comptroller of Public Accounts *Reported Sales and Taxable Sales for Major Division: Retail Trade*  
Sales Tax Revenues Data is from the Comptroller's ITS Assessment for August 1998

In designing future systems, management should design processes to measure the benefits created by the system. Management should also measure whether its systems accomplish funding requirements.

Section 2:

## Management's Design of the Integrated Tax System Failed to Account for Some Potential Problems in Access Controls, Most of Which Are Now Being Corrected

Inadequate controls over system development created or did not ensure correction of security weaknesses in the network, programming changes, and access monitoring. The current administration recognized and began corrective measures for the majority of the security findings independent of this audit. Information security over the Integrated Tax System is especially important because most information stored on the system is confidential tax data.

Section 2-A:

### Management Is Currently Taking Steps to Correct Significant Weaknesses Over Its Local Area Network (LAN)

The current administration is strengthening controls over the agency's LAN. The lack of effective centralized control over the agency's LAN and inadequate firewalls together create a greater risk of unauthorized system access. This unauthorized use could result in damage to the Integrated Tax System and its associated data or disclosure of sensitive information:

- Lack of effective centralized controls** - Administration of the agency's LAN had been divided between a centralized function and a division-level function. With this organization, strong, uniform policies and procedures are essential for critical areas such as access to field office computer rooms, authorization of access to the LAN, and remote dial-in access to the LAN. Such policies and procedures were not in place. As a result, the two groups enforced uncoordinated, varying levels of security. Management is currently

taking steps to create effective, centralized LAN controls as part of its improvement of information technology controls.

- **Inadequate firewall** - The decentralized nature of LAN security caused management to set its firewall<sup>3</sup> at the “all access” level. For a firewall to be effective, it must inspect all traffic to and from the Internet. The firewall must permit only authorized traffic to pass, and the firewall itself must be immune to penetration. An effective firewall decreases the risk that unauthorized individuals can gain access to agency systems through the Internet. Management has begun to erect an effective firewall as part of its improvement of LAN security.

These weaknesses also put other key automated systems at risk. Although these systems are housed on the agency’s mainframe where they are protected by an effective security system, the LAN is a means of potential access.

Recommendation:

Management should complete its strengthening of LAN controls. This effort should include completing an effective firewall, testing the firewall, adopting effective LAN administration policies, and completing its reorganization of LAN administration.

Comptroller’s Response:

*Management began the process of strengthening LAN controls prior to the initiation of this audit. In fact, this issue was immediately addressed by the new Administration within two months of taking office. An IT security taskforce was appointed, and a complete network security audit was conducted by an outside consultant. The consultant’s recommendations have been reviewed and are in the process of being implemented. A firewall has been successfully implemented and LAN administration has been reorganized. While several other state agency systems were recently hacked, the Comptroller’s LAN has not been penetrated.*

*Management does not agree that ITS data was in any way compromised by LAN access or lack of control over LAN access. RACF and DB2 both provide extremely tight compensating controls and do not allow any unauthorized access to data. Mainframe security procedures are well documented and centralized.*

Auditor’s Follow-Up Comment:

Management should ensure that all means of access to key automated systems have sufficient security. Although management has implemented effective mainframe

<sup>3</sup> An Internet firewall is a system or group of systems that enforces a security policy between an organization’s network and the Internet. The firewall determines which inside services may be accessed from the outside, which outsiders are permitted access to the permitted inside services, and which outside services insiders may access.

security, it is just one component of total system security. By keeping unauthorized users off the Comptroller's LAN, effective LAN controls limit unauthorized attempts to breach mainframe controls.

Section 2-B:

### **Management Has Committed to Improving Weaknesses in Its Change Controls**

Management has committed to improving its change controls. Ineffective change controls increase the risk of unauthorized changes to production programs. Such changes increase the risk of damage to data, errors involving tax data, or fraud.

Change control weaknesses in the Integrated Tax System are:

- **Monitoring of maintenance and emergency programming changes is insufficient.** Programmers making emergency or maintenance changes to production programs have the ability to approve those changes themselves and move the changes permanently into production. All changes to production programs should be reviewed, tested, and approved by a knowledgeable individual, such as an independent reviewer, before the change is moved permanently into production. The purpose of this review is to detect errors or code intentionally inserted to compromise program security. Although emergency or maintenance changes do not undergo this scrutiny, most other types of programming changes are effectively monitored.
- **Management may not be able to track unauthorized program changes to their source.** Change control programs monitor programming changes to systems that are up and running. The Integrated Tax System used an effective change control program that enabled management to trace errors and unauthorized changes to a specific version of the program and thus to the originator.

Management had to move the Integrated Tax System to another change control program due to conflicts between the first program and the Integrated Tax System. The second program only enables management to access certain versions of the program, thus reducing the likelihood that management can link problem program changes to their originators. Management plans to move the Integrated Tax System back to the first program once the conflicts are resolved, but it will have this diminished ability to track the origin of programming problems for the months in which the Integrated Tax System uses the second program.

#### Recommendation:

Management should institute effective monitoring of all programming changes. Effective monitoring controls include:



- Automated controls that require maintenance of all versions of the Integrated Tax System until the Integrated Tax System can be moved back into its original, more effective change control program
- Policies that require effective monitoring of programming changes

Comptroller's Response:

*Management has closely monitored the vendor responsible for modifying the change control package (PAC) used by ITS. Currently, PAC does not function as intended. Therefore, ITS cannot be migrated into PAC until it is a working change control package. In all cases, where a change control package can be effectively used, management has demonstrated its commitment to its use. For example, Endeavor is used to manage COBOL programs and job control language, and CCC/Harvest is used to manage PowerBuilder. As soon as PAC is totally functional, ITS will be migrated back into PAC. Management has not observed any deleterious effects from not being in PAC which have jeopardized tracking of program changes and migrating programs into production. In fact, the entire franchise conversion was successfully accomplished without PAC.*

*Management is currently implementing a plan to separate program change duties more effectively.*

Section 2-C:

**Management Does Not Monitor Key Integrated Tax System Access Logs to Detect Unauthorized Access**

Management does not monitor key access logs, which would enable management to detect unauthorized access to the Integrated Tax System. Insufficient monitoring of activity on the Integrated Tax System increases the risk that unauthorized use of the system will not be detected before system damage occurs or confidential information is disclosed.

Monitoring key access logs is an important means of controlling system access. Monitoring access logs is an effective way to detect persons attempting unauthorized access to the system or portions of the system. Access logs also can show suspicious use patterns within the system by authorized users. Looking for unexpected use patterns can help identify attempts to access the Integrated Tax System before unauthorized access or damage to production programs occurs.

Recommendation:

Management should ensure it can effectively monitor the activities of Integrated Tax System users. Management should, at a minimum, monitor activity for the following key access logs:

- AUDIT TRAIL
- The automated log kept by the change control program

Comptroller's Response:

*Management will examine the types or combinations of business transactions which are captured in the AUDIT TRAIL and which might suggest suspicious activity by employees and will determine the cost effectiveness of this type of monitoring. Although there are a significant number of compensating controls within the existing business processes which make perpetrating fraudulent activities very difficult and ultimately detectable, Management agrees this type of monitoring, if cost effective, could be beneficial.*

Section 3:

## **Statewide Oversight of the Development of Automated Systems Should Be Strengthened**

Issues raised during this audit point to the need for good project control mechanisms. Effective controls at the statewide level could significantly reduce the risks related to implementing large information technology projects.

The Quality Assurance Team is composed of personnel from the State Auditor's Office and the Legislative Budget Board.<sup>4</sup> The Quality Assurance Team is an oversight entity that is responsible for monitoring new automated systems developed by state agencies. Large systems, such as the Integrated Tax System, are generally monitored closely.

The Quality Assurance Team should strengthen its monitoring of automation projects. It did not have effective systems in place to hold Comptroller management accountable for not correcting known, significant deficiencies in the development of the Integrated Tax System. Failure to ensure accountability contributed to these problems not being corrected. Additionally, the Quality Assurance Team has lowered its oversight of the Integrated Tax System despite the fact that significant development remains.

Section 3-A:

### **The Quality Assurance Team Should Implement Systems to Increase Agency Accountability**

The Quality Assurance Team does not have effective systems in place to hold agencies accountable for not correcting known, significant deficiencies in system development. Failure to correct significant issues in a timely manner jeopardizes project success by

<sup>4</sup>The Department of Information Resources performed the Quality Assurance Team functions, currently performed by the Legislative Budget Board, during the development of the Integrated Tax System. The functions were transferred on September 1, 1999.

increasing the risk that projects will exceed expected costs or will be developed with significant expectation gaps.

An examination of the Quality Assurance Team's monitoring documents revealed that it identified several significant development issues during the life of the Integrated Tax System, including the lack of performance measures. Although the Integrated Tax System project team corrected many of these issues, some remained uncorrected. Evidence shows that the Integrated Tax System project team was aware of at least some of the uncorrected issues.

The uncorrected issues, which are discussed elsewhere in this audit report, are:

- Failure to create systems to capture outcome objectives, such as cost/benefit data (Section 1-B)
- Inadequate system documentation (Section 4-B)
- Failure to ensure compliance with a General Appropriations Act rider (Section 1-B)

Although it is likely all issues were discussed with Comptroller management, documentation only exists to show that the first two issues were brought to the attention of key project personnel. This documentation did not include any formal notification to Comptroller management regarding these issues. The Quality Assurance Team did not identify many of the other problems identified by this audit report because its monitoring emphasizes different areas than an audit.

In addition to not formally notifying Comptroller management of these issues, there is no evidence that the Quality Assurance Team formally notified the State's leadership that the Integrated Tax System had significant, uncorrected problems. Such formal notification gives state leaders an opportunity to intervene. Such intervention is beneficial, since the Quality Assurance Team can only initiate sanctions against a project that fails to meet its objectives. Intervening in other situations is necessary because it is possible for a project to meet its objects and to not be successful.

Recommendation:

The Quality Assurance Team should consider means to improve project monitoring and encourage agencies to correct problems in a timely manner. The Quality Assurance Team should consider taking the following steps:

- Formally notify agency management of existing issues and management's duty to correct those issues.
- Ensure internal audit involvement in automation projects. Effective internal audit involvement minimizes the risk that problems the Quality Assurance Team is not designed to detect will not go unnoticed.
- Notify the State Auditor of any unresolved issues that threaten project success.

- Revise the current yearly report to the Legislature regarding the status of major information technology projects to include budget and time line projections, quality issues, and recommendations. In addition, the report should prominently note issues agencies have not addressed.

In addition, we recommend that the Comptroller's office track and correct issues brought to its attention by the Quality Assurance Team for current and future projects. If management disagrees with any finding, then it should formally notify the Quality Assurance Team.

Quality Assurance Team's Response:

*The Quality Assurance Team is charged with reviewing projects with a total cost of \$1,000,000 or more. The Team strives to identify and monitor all high-risk projects with the objective being to enable the project to be successful. The Team appreciates the recommendations for improving the feedback to the agencies and the State Auditor and will consider implementing the recommendations when needed. The Team will continue to identify problems to the leadership through the annual report and will consider the changes recommended by this report.*

Comptroller's Response:

*We concur that the Quality Assurance Team should improve its project monitoring and communication with agencies. Neither the Comptroller's office nor the State Auditor's office could identify any formal communications regarding system deficiencies. We recognize that the knowledge base surrounding good system development is increasing with time. Indeed, just this year, the State Auditor's Office has begun a pilot project in recognition of the value of improving system development processes statewide. We are glad that this outstanding need is finally being addressed and believe it will lead to improved system development throughout state government.*

Section 3-B:

**The Quality Assurance Team Should Adequately Monitor High-Risk Projects**

The Quality Assurance Team significantly decreased its oversight of the Integrated Tax System while substantial application development was still occurring. The oversight level was decreased in response to Comptroller management changing the Integrated Tax System's project status to a "growth and enhancement" project rather than a "development project over the threshold." The Quality Assurance Team does not actively monitor "growth and enhancement projects."

High-risk automated projects like the Integrated Tax System should be monitored by the Quality Assurance Team, regardless of status, until completion or the project ceases

to be a high-risk project. Failing to monitor high-risk projects increases the likelihood they will not meet important objectives.

Reclassifying the Integrated Tax System also resulted in a format change to the Biennial Operating Plan that makes it substantially more difficult for interested parties to determine the Integrated Tax System's total project cost. Project expenses are now split throughout the Comptroller's Biennial Operating Plan and are never presented in total. Splitting project costs makes it difficult for interested parties to determine the total project cost and to monitor whether these costs grow over the life of the project.

Recommendation:

The Quality Assurance Team should adopt criteria for determining when project risk has dropped enough to allow a change of monitoring levels. The Quality Assurance Team should also coordinate a format revision for the Biennial Operating Plan so that all costs for each project are presented in aggregate somewhere in the report. Significant changes in system functionalities and associated costs over the project's life should also be documented clearly. This change will enable persons monitoring projects to easily determine the total costs of a given project.

In addition, the Quality Assurance Team should determine whether its monitoring of the Integrated Tax System is sufficient for the current level of project risk.

Quality Assurance Team's Response:

*The Quality Assurance Team monitored the Integrated Tax System and assessed the risk of the project. During the time of the monitoring, the agency changed strategies and management direction. The Comptroller's Office made the decision to close the project and stated that the original project was completed. The Quality Assurance Team will consider revisions to the Biennial Operating Plan format to allow more reliable identification of major information resource projects for review.*

## Management Should Improve Its Methodology for Future Systems Development

### What is a system development life cycle?

A system development life cycle is an organized methodology for developing and maintaining automated systems. System development life cycles usually involve the following processes:

- Identifying problems with the current system, opportunities for improvement, and objectives for the new system
- Determining users' information requirements
- Analyzing system needs
- Designing the recommended system
- Developing and documenting software
- Testing and maintaining the system
- Implementing and evaluating the system

Improving agency controls over system development can help ensure that future automated systems are cost-effective (see text box). Effective controls can also reduce risks related to system functionality and security.

Section 4-A:

### Management Should Use a Comprehensive Needs Assessment in Future System Development

Management did not use a comprehensive needs assessment for the Integrated Tax System project, which increased the risk of developing a system that does not meet expectations. Instead, management largely used a draft report, which discussed, among other things, desirable traits for an automated tax system. A short-term, multi-functional team that was assembled to study the agency's tax systems developed this draft report, which has never been finalized. (Management has stated that the draft report was never finalized due to the sensitive reorganization recommendations made in the report.)

In addition, management used a system architecture report prepared by a consulting service. This second report examined some of the technical issues associated with

implementing the Integrated Tax System. Management believed that the need for a new tax system to replace its inefficient, out-of-date systems was so obvious that a more detailed needs assessment was not needed. A detailed needs analysis would have included the following:

- **Formal cost-benefit analysis** Management did not prepare a detailed cost-benefit analysis. The cost-benefit analyses in other documents were too vague to contain meaningful data. Failure to perform a formal cost-benefit analysis increases the risk of creating an application whose costs outweigh its benefits.
- **Identification of the project's impact on the agency** Although the draft report contains some information on the identification of the effect of the new system requirements on the agency, it does not contain sufficient detail. Automated systems can affect an agency's organizational structures. They can also affect work procedures and the agency's technical needs. As a result, there was an increased risk that management would fail to identify significant infrastructure problems that the new automated system might have created.

Such issues as mainframe capacity and the availability of experienced staff for the sales tax conversion affected management's ability to successfully complete the project as time went on.

Failure to develop a comprehensive needs analysis at the beginning of a major automation project increases the risk that the system may not have all features envisioned by management or needed.

Recommendation:

We recommend that management create a comprehensive needs analysis methodology and require its use on all future projects. The needs assessment should have at least all the attributes listed above.

Comptroller's Response:

*The draft report which is referenced above was an 185-page report with over 50 pages of exhibits developed by a team of 15 people over a 9-month period. Extensive research was done by the team with hundreds of agency employees. The report remained as DRAFT due to the sensitive reorganization recommendations made within the report. This DRAFT designation was discussed with the SAO on several occasions. The report looked in depth at the organizational impact of the system changes on business functions and also recommended a complete review of the agency's technical infrastructure. This review did in fact occur and ITS has been developed according to that technical infrastructure.*

Auditor's Follow-Up Comment:

We have no evidence of whether the draft report met all the requirements of a needs assessment because management never furnished the audit team with a complete copy of this document. The audit team repeatedly requested the Comptroller's needs assessment for the Integrated Tax System and was only furnished with a few pages of the draft report during fieldwork and the system architecture report several weeks after fieldwork.

The Texas Open Records Act was written, in part, so that citizens would be able to access information needed to hold governmental entities accountable. Despite its concerns regarding any proposed reorganization in the draft report, management should have finalized the draft report and made it public prior to Integrated Tax System development. A needs assessment for a multi-million dollar automated system for a governmental agency should have been available to all stakeholders—including the State's leadership and the public—early in the system development process.

Section 4-B:

## **Management Should Strengthen System Documentation Standards**

The current system development life cycle does not have adequate system documentation standards. It documents some aspects of the system well, such as the location of data. However, it fails to document other important system features such as how data flows through the system. Other documentation is not current. As a result, loss of personnel may prevent timely, effective system management and improvement due to a significant loss of knowledge regarding the system. Key data regarding the system should be documented and the resulting records should be kept up-to-date.

For example, during our work we experienced great difficulty in gaining an understanding of the system because there was no documentation of data flow. There were no diagrams of the data flow and no one person knew the system data flow. As a result, it took interviews with several programmers to create an accurate depiction of the data flow.

### Recommendation:

As part of its system development life cycle for future projects, management should require that the team developing the project identify and document all critical information. This information should include all key parts of the system's architecture. The team should document sufficient information to enable the agency to retain critical knowledge despite losing staff.

Additionally, all critical Integrated Tax System documentation should be updated and maintained.

### Comptroller's Response:

*There are system documentation standards for development of a Software Requirements Specification and a Software Design Statement. In addition, the Data Models and Data Definitions are developed in strict adherence to data modeling industry standards. Use of the Software Requirements Specification has been demonstrated over six times on the ITS project. The Software Design Statement has been used multiple times and its use is expanding. Development of project plans is standard, and standards for test plans are being developed. In addition, a very structured process for requesting modifications to existing functions has been in place for over two years.*

*Management believes ITS has developed standards for key documentation needed during systems development and will continue efforts to develop other standards which meet the business needs of the agency.*



Auditor's Follow-Up Comment:

Documenting all key parts of an automated system is a management best practice. Understanding the flow of data into any automated system is key to ensuring that adequate controls exist to ensure the accuracy and reliability of this data. The audit team repeatedly asked management to document the flow of data into the Integrated Tax System. Management was unable to produce any diagram of this key process, forcing the audit team to create its own diagram. The audit team had to interview several programmers because no one member of the Comptroller's staff knew how data flowed through the Integrated Tax System.

Section 4-C:

**Management Should Formalize and Mandate Key System Development Processes**

Management currently does not require use of its quality assurance process and post-implementation review on all projects. In addition, the post-implementation review does not use a documented, standardized methodology. The current informal post-implementation review methodologies do not have important features such as written guidelines, procedures, or requirements. Projects that do not use a standardized quality assurance process have an increased risk that important review steps might be missed and significant problems may not be detected. Standardized, structured post-implementation reviews enable organizations to improve their system development processes. Mandated, formalized methodologies increase the likelihood that all important factors are considered, thereby increasing overall system quality and functionality.

Recommendation:

Management should develop, document, and maintain standardized processes for all key elements of its system development life cycle including the quality assurance process and post-implementation review. These elements should be mandated for all significant automation projects.

Comptroller's Response:

*As stated in response to Section 4-B, there are system documentation standards for development of a Software Requirements Specification and a Software Design Statement. In addition, the Data Models and Data Definitions are developed in strict adherence to data modeling industry standards. Use of the Software Requirements Specification has been demonstrated over six times on the ITS project. The Software Design Statement has been used multiple times and its use is expanding. Development of project plans is standard, and standards for test plans are being developed. In addition, a very structured process for requesting modifications to existing functions has been in place for over two years.*

*When system development life cycle elements are followed, quality assurance becomes inherent in the processes. Because ITS has had four successful implementations since Sales Tax in 1996, some of the processes which are being used must provide the elements needed to ensure a quality development project. ITS continues to evaluate areas of improvement and to build on those to enhance programmer productivity and user satisfaction.*

Auditor's Follow-Up Comment:

An effective quality assurance process and post-implementation review are key portions of an effective system development life cycle. Management needs to mandate the use of both these elements in the development of all automated systems. In addition, the post-implementation review should use a documented, standardized methodology. The absence of problems on projects which did not use an effective quality assurance process and post-implementation review in no way indicates that management can continue to develop effective, secure applications without them.

Section 4-D:

**The Internal Audit Department Should Play a Significant Role in Future System Development**

The Internal Audit Department was not significantly involved in the development of the Integrated Tax System because at the time the Integrated Tax System was developed, the Comptroller's system development life cycle did not require Internal Audit's participation. As a result, there was an increased risk that systems would be developed with serious control weaknesses or expectation gaps. Entities with internal audit departments should involve internal audit to help identify and manage the risks of developing new systems and to provide business system expertise.

The current administration is requiring its internal audit function to be involved in the development of major new systems.

Recommendation:

Internal Audit should be significantly involved in the design of all major new systems.

Comptroller's Response:

*Management concurs with this recommendation. Internal Audit will be significantly involved in the design of all major new systems*

## Objective, Scope, and Methodology

### Objective

Our audit objective was to answer the following questions:

- Do the Integrated Tax System's key controls ensure safeguarding of relevant state assets and correct reporting of tax revenues?
- Has implementation of the Integrated Tax System resolved key issues from prior State Auditor's Office audits?
- Will the Integrated Tax System enable the Comptroller of Public Accounts to achieve planned efficiencies without significantly decreasing organizational effectiveness?

### Scope

The scope of this audit included consideration of the application controls over the Integrated Tax System and the general controls that had a significant effect on the Integrated Tax System's ability to safeguard assets and accurately report tax revenues. These general controls were the agency's system development life cycle and its access controls over client servers and its mainframe. In addition, we examined the productivity of the agency's tax auditors, the agency's efforts to identify persons not in compliance with state tax laws, the agency's use of certain tax data to manage its audit function, and the financial benefit directly resulting from implementation of the Integrated Tax System.

### Methodology

The audit methodology consisted of gaining an understanding of the Integrated Tax System's system architecture and the data flow through the Integrated Tax System and other associated systems. In addition, we created an inventory of management's assertions regarding the capabilities and benefits of the Integrated Tax System. Conventional audit procedures were applied to collect information and test significant controls, including interviews with agency management and staff. Agency financial data was analyzed, and relevant reports and documentation were reviewed. Audit testing and analysis included physical observation of automated controls, a trend analysis of auditor productivity, and a trend analysis of tax collections.

## Other Information

Fieldwork was conducted from March 1999 to October 1999. The audit was conducted in accordance with generally accepted government auditing standards. The following members of the State Auditor's Office performed the audit work:

- Gregory S. Adams, CPA, CGFM (Project Manager)
- Jaime Contreras, MBA (Assistant Project Manager)
- Serra Tamur, MPAff
- Doug Binnion, MBA
- Dennis O'Neal, CIA (Quality Control Reviewer)
- Pat Keith, MBA, CQA (Audit Manager)
- Craig Kinton, CPA (Audit Director)

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