

**Deloitte &  
Touche LLP**



# *Controls Consulting Final Report*



San Joaquin Delta College

*June 26, 1996*

**Deloitte Touche  
Tohmatsu  
International**



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San Joaquin Delta College

# Scope and Objectives of Data Processing Environment Review

San Joaquin Delta College (SJDC) has asked Deloitte & Touche to assess key controls and management issues within their data processing environment. Specifically, we have assessed the following areas:

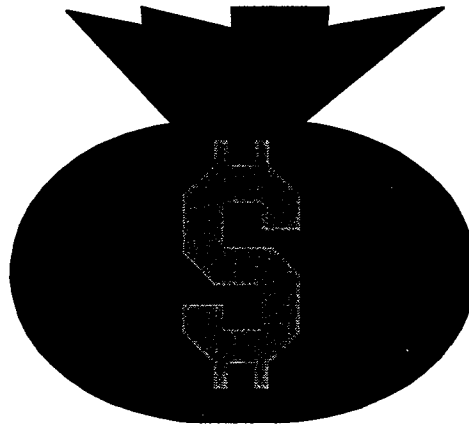
1. **System 2000 - Payroll Application:** we have assessed the key application controls and separation of duties within the Payroll Application. In addition, we have performed recalculations of actual payroll transactions on a test basis to provide SJDC with assurance on the computation of payroll, and assessed the hourly faculty payment process.
2. **Macintosh Client/Server environment (System 2000):** we assessed general computer controls related to the areas of information security, systems acquisition development and maintenance, computer operations, and information systems support. Within the Information System Support area we focused on the assessment of controls around problem tracking and resolution, network management, firewall implementation approach, remote access, and database administration.





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# Payroll Application Review





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# Payroll Application Objectives and Scope of Review

The scope and objective of the System 2000 - Payroll Application review was to assess the key application controls and separation of duties within the Payroll Application. We performed this review by:

- Gaining a high-level understanding of the Payroll Application and related interfaces,
- Developing a potential error matrix that identifies the potential errors or risks associated with the Payroll Application and corresponding business processes,
- Identifying controls that SJDC currently has in place to mitigate the exposures identified in the potential error matrix, and
- Identifying control weaknesses and exposures.

In addition, we have performed recalculations of actual payroll transactions on a test basis to provide SJDC with assurance on the computation of payroll, and assessed the hourly faculty payment process.

The following slides outline our observations and recommendations resulting from our review of the Payroll Application.





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# Payroll Application

## Gain Enhanced Understanding of Payroll Application & Corresponding Business Processes (Potential Error Matrix)

The "Potential Error Matrix" is a tool used to identify the Risks and corresponding Control Procedures related to a specific application and its associated business processes. The matrix facilitates the identification of control procedures and is useful in outlining weaknesses in controls and appropriate control recommendations.

**POTENTIAL ERROR MATRIX - Payroll Application**

Potential Error	Risks/Issues	Control Procedures/Observations	Appropriate Controls in Place	Recommendation
Validity	Employees entered into the payroll application are not valid.	Payroll technician reviews the Payroll Warrant Register, detailing all payroll checks for the current period. Payroll technician verifies employment status of new employees with the H/R benefits assistant for all new full-time employees. However, there is still the possibility of invalid employees being entered.	No	Management level review of all new employees entered into the payroll application. Review may be facilitated through the creation of a report detailing all new employees entered into the payroll application. The review may be authenticated and verified by electronic signature.

The "Potential Error" represents the general category within which a specific Risk/Issue is categorized. The potential error "Validity" relates to the accuracy and integrity of a particular transaction or piece of information. The 4 primary Potential Errors addressed in the Payroll Application matrix are:

- Validity
- Completeness
- Recording
- Cutoff

The "Risks/Issues" represents the the potential risks that may exist related to each category of Potential Errors. The risks/issues are tailored to the System 2000 - Payroll Application and corresponding business processes that exist surrounding SJDC's payroll process.

The "Control Procedure /Observations" represent the procedures that are currently in place at SJDC to mitigate the Risks/Issues previously identified. In certain circumstances their may not be a mitigating control control procedure in place.

The "Recommendations" represent suggested control procedures that may be put in place to mitigate Risks/Issues for which an appropriate control procedure was not identified.

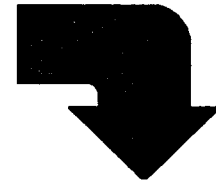


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# Payroll Application Control Observations and Recommendations

## POTENTIAL ERROR MATRIX - Payroll Application

Potential Error	Risks/Issues	Control Procedures/Observations	Appropriateness of Controls in Place	Recommendations
Validity	Employees entered into the payroll application are not valid.	Payroll technician reviews the Payroll Warrant Register, detailing all payroll checks for the current period. Payroll technician verifies employment status of new employees with the H/R benefits assistant for all new full-time employees. However, there is still the possibility of invalid employees being entered.	No	Management level review of all new employees entered into the payroll application. Review may be facilitated through the creation of a report detailing all new employees entered into the payroll application. The review may be authenticated and verified by electronic signature.



### Observation #1

- Responsibility for the accuracy and appropriateness of employee pay rate tables falls within the Human Resource function. However, application programmers in the Computer Services Department are currently responsible for making changes to the pay rate tables, which may result in incorrect or inappropriate changes to such tables.

### Recommendation

- As the responsibility for the accuracy and appropriateness of pay rate tables falls within the within Human Resource function, the Human Resource function should be responsible for making changes to the pay rate tables. Changes to pay rate tables should trigger the creation, automated distribution and subsequent management level review of a pay rate table change report. The review may be authenticated and verified by electronic signature.

### Observation #2

- There is no summary report or management level review of new employees entered into the Payroll Application, which may result in the entry of invalid employees.

### Recommendation

- The Human Resource function should perform a management level review of all new employees entered into the Payroll Application. This review may be facilitated through the creation and automated distribution of a report detailing all new employees entered into the Payroll Application. The review may be authenticated and verified by electronic signature.



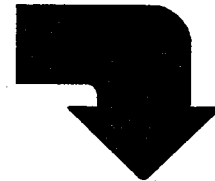


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# Payroll Application Control Observations and Recommendations

## POTENTIAL ERROR MATRIX - Payroll Application

Potential Error	Risks/Issues	Control Procedures/Observations	Appropriate Controls in Place	Recommendations
Validity	Employees entered into the payroll application are not valid.	Payroll technician reviews the Payroll Warrant Register, detailing all payroll checks for the current period. Payroll technician verifies employment status of new employees with the H/R benefits assistant for all new full-time employees. However, there is still the possibility of invalid employees being entered.	No	Management level review of all new employees entered into the payroll application. Review may be facilitated through the creation of a report detailing all new employees entered into the payroll application. The review may be authenticated and verified by electronic signature.



### Observation #3

- Currently, there is no management level review or oversight of the “position” entries and assignments of “positions” to employees.

### Recommendation

- Responsibility for the entry of positions and the assignment of employees to positions falls within the Human Resources function. New positions entries, changes to existing positions, and the assignment of positions to employees should trigger the creation, automated distribution and subsequent management level review a position control report. The report should be reviewed by both the Human Resource function and the Business Office. The review may be authenticated and verified by electronic signature.

### Observation #4

- “Assignments” within the Payroll Application are used to control the pay rate and the duration of an employees assignment at the college. “Assignments”, therefore, have a direct impact on the amount of pay received by each employee. The “Assignments” are created in various ways for full-time, part-time, and short-term employees. Currently, changes to assignments are not reviewed by management personnel.

### Recommendation

- The process of creating new “Assignments” or changing current “Assignments” should trigger the creation, automated distribution and subsequent management level review an assignment creation/change report. The review may be authenticated and verified by electronic signature.





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# Payroll Application Control Observations and Recommendations

POTENTIAL ERROR MATRIX - Payroll Application

Potential Error	Risks/Issues	Control Procedures/Observations	Appropriateness of Controls	Comments
Validity	Employees entered into the payroll application are not valid.	Payroll technician reviews the Payroll Warrant Register, detailing all payroll checks for the current period. Payroll technician verifies employment status of new employees with the H/R benefits assistant for all new full-time employees. However, there is still the possibility of invalid employees being entered.	No	Management level review of all new employees entered into the payroll application. Review may be facilitated through the creation of a report detailing all new employees entered into the payroll application. The review may be authenticated and verified by electronic signature.



### Observation #5

- Access restrictions which control the ability to make changes to payroll computation parameters are currently being defined, but have not yet been placed in operation.

### Recommendation

- Appropriate access control restrictions should be implemented based upon the Access Restriction/Responsibility document prepared by Deloitte & Touche. In addition, changes to the parameters should trigger the creation, automated distribution and subsequent management level review of a payroll parameter change report. The review may be authenticated and verified by electronic signature.

### Observation #6

- Various application programmers within the Computer Services Department currently have access to production Payroll Application source code and data.

### Recommendation

- Access to production Payroll Application source code and data should be restricted to appropriate change control and database administrator personnel within the Computer Services Department.

### Observation #7

- The ability to enter additional earnings, benefits, and deductions is protected by access restrictions. However, there is no management level review of additional amounts entered to ensure the appropriateness and validity of such entries.

### Recommendation

- The entry of additional earnings, benefits, and deductions should trigger the creation, automated distribution and subsequent management level review of an additional payroll entries report. The review may be authenticated and verified by electronic signature.





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# Payroll Application Control Observations and Recommendations

POTENTIAL ERROR MATRIX - Payroll Application

Potential Error	Risk/Impact	Control Procedures/Observations	Appropriate Controls in Place	Recommendation
Validity	Employees entered into the payroll application are not valid.	Payroll technician reviews the Payroll Warrant Register, detailing all payroll checks for the current period. Payroll technician verifies employment status of new employees with the H/R benefits assistant for all new full-time employees. However, there is still the possibility of invalid employees being entered.	No	Management level review of all new employees entered into the payroll application. Review may be facilitated through the creation of a report detailing all new employees entered into the payroll application. The review may be authenticated and verified by electronic signature.



### Observation #8

- There are various individuals within the H/R, Payroll, and Business Office (Accounting) functions who have access to screens and functions within the Payroll Application that are outside their area of responsibility.

### Recommendation

- SJDC should implement appropriate access control restrictions based upon the Access Restriction/Responsibility document prepared by Deloitte & Touche.

### Observation #9

- There are several locations on campus where unauthorized individuals may gain access to desktop Apple PC's that are running the System 2000 application and corresponding payroll modules. These PC's do not appear to be protected by time-outs or password protected screen savers.

### Recommendation

- SJDC should develop appropriate Information Protection and Confidentiality Policies and Procedures. These policies and procedures should be developed by SJDC personnel in all functions, including Computer Services, Administration, Instruction Office, Division Offices, etc. In addition, these policies and procedures must be supported and communicated by SJDC management to ensure campus-wide knowledge and understanding of the college's expectations related to information protection. (Refer to General Computer Controls Assessment observation #5 for additional discussion.)





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# Payroll Application General Observations and Recommendations

Observation	Business Issue	Recommendation
<p>There appears to be a lack of appropriate training for the System 2000 - Payroll Application users, including Human Resources, Business Office (Accounting), etc.</p>	<p>Due to the significant functionality built into the System 2000 - Payroll Application, users may not be able to take advantage of all of the Payroll Application's functions without appropriate training. As such, users may not be utilizing the application as intended, and to its fullest capacity.</p>	<p>Payroll Application programmers and system analysts should develop appropriate training programs and materials for users of the Payroll Application. To accomplish this goal, the Computer Services Department must reallocate its limited resources between continued application development and the development of an appropriate training program and materials to adequately meet user training needs.</p>
<p>User documentation for the System 2000 - Human Resource &amp; Payroll Module has not been updated to reflect screen and functionality changes to the Payroll Application.</p>	<p>Outdated user documentation may lead to difficulties in normal application operation and new user training. Without appropriate user documentation, users may not understand the functionality of the application.</p>	<p>Enhancements should be made to the Payroll Application user documentation to reflect current functionality and screen layouts. The Computer Services Department must focus on the cost/benefit of developing and maintaining appropriate application documentation, and reallocate their resources accordingly.</p>





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# Payroll Application General Observations and Recommendations

Observation	Business Issue	Recommendation
<p>Position/Entitlement control modules appear to be unused and incomplete. The position/entitlement control modules do not appear to meet the requirements and goals of the position control function.</p>	<p>The position control function appears to be a responsibility of the Business Office. The Business Office is currently unable to take full advantage of the Payroll Application to assist with fulfilling the position control and budgeting needs of the college.</p>	<p>Appropriate management personnel in the user groups (H/R, Business Office, etc.) in conjunction with Computer Services, should evaluate the needs of the position control function and develop appropriate requirements and design specifications that will meet the needs of the position control function.</p>
<p>As noted in several Payroll Application control observations, there appears to be a lack of appropriate management level review of various Payroll Application inputs, outputs and processes. Several Payroll Application control recommendations, focused on the use of a report distribution and approval system to facilitate the distribution, review and verification of reports.</p>	<p>Appropriate management level review of Payroll Application inputs, outputs and processing provides management with a mechanism for controlling the Payroll Application and its corresponding business processes.</p>	<p>SJDC should evaluate the effectiveness, efficiency, and cost/benefit of implementing an automated report distribution system. Automated report distribution systems are extremely effective in facilitating the timely distribution of management reports and allow for the use of technologies such as electronic signatures.</p>





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# Payroll Application Delineation of Roles & Responsibilities

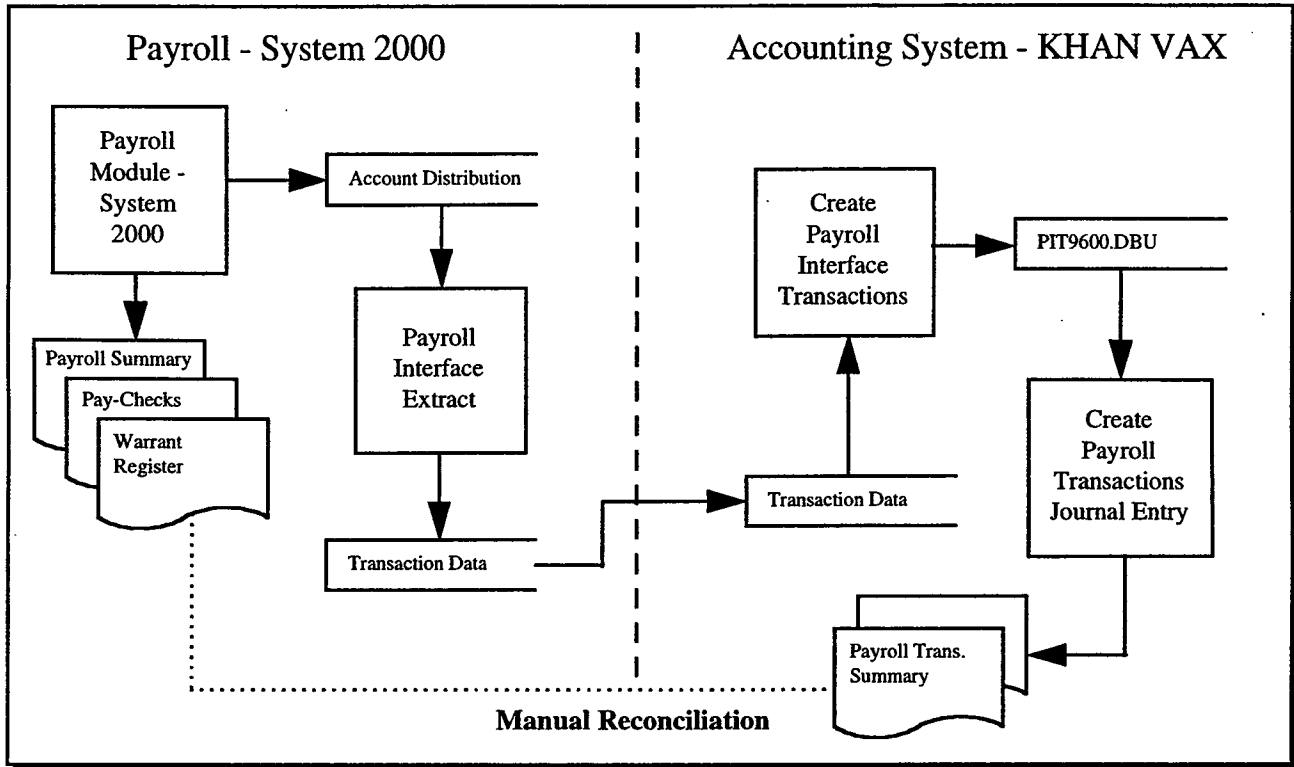
Payroll Application Module	Payroll	H/R	Business Office	Computer Services
Launcher	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Position Group Editor		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Position Group Package Editor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Position Editor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Work Calendar Editor		<input checked="" type="checkbox"/>		
Organizational Unit Editor		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Entitlement Browser	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Entitlement Editor		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Account Adjustment Editor		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Additional Earnings Editor	<input checked="" type="checkbox"/>			
Individual Benefits Editor	<input checked="" type="checkbox"/>			
Earnings Editor		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Benefits Editor		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Deductions Editor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Parameter Editor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Timecard Period Editor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Leave Type Editor		<input checked="" type="checkbox"/>		
Employee Browser	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Assignment Browser	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Assignment Editor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Employee Editor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Individual Deduction Editor	<input checked="" type="checkbox"/>			
Paycheck Editor	<input checked="" type="checkbox"/>			
Leave Transaction Editor		<input checked="" type="checkbox"/>		
Timecard Editor	<input checked="" type="checkbox"/>			

NOTE: The table shown above is for discussion purposes only. For additional details and updates refer to the "Payroll Application Access Restriction/Responsibility" document maintained by Bob Emerson.





# Payroll Interface Issues



## Observation

- Accounting personnel in the Business Office reconcile the Payroll Warrant Register (detailing all payroll checks for the current period) with a Summary Payroll report produced by System 2000 Payroll Application, and a Transaction Summary report from the accounting system. While this reconciliation ensures the accuracy and integrity of the interface between the Payroll Application and the accounting system, the procedure is time consuming and has not been automated to ensure performance on a regular basis.

## Recommendation

- The reconciliation procedure currently being performed should be streamlined and automated to ensure that it is performed on a regular basis in an efficient and effective manner. In addition, verification of the performance and the review of the reconciliation may be achieved through electronic signatures.



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# Payroll Application Hourly Faculty Payment Process

## Payment Process:

- The hourly faculty payment process requires the interaction of the Payroll module and the Student Information System module of System 2000. Hourly faculty members are compensated based upon the total number of hours for a given class session (referred to as the load) and their individual pay rate. The Division Chairs and the Instruction Office are responsible for assigning class sessions to instructors and establishing the correct load for each hourly faculty member. Once a semester, when the class session assignments are complete, the Computer Services Department executes a process within the Payroll Application to create a payroll "Assignment" so that the hourly faculty member will be paid. After this process is complete, the Division Chairs may no longer make changes to the load of an individual hourly faculty member, as the change will have a direct impact on the employees pay. Therefore, changes to the class schedule and employee loads must be funneled from the Division Offices to the Instruction Office. The Instruction Office is then responsible for making changes to individual employee loads, thus ensuring the accuracy of the employees pay. The Instruction Office communicates all changes to Human Resources (Payroll Department) to ensure the change is reflected in the employees pay.

## Issues and Recommendations:

- The current hourly faculty payment process appears to have appropriate controls to ensure the accuracy of hourly faculty member compensation.
- To ensure the continued accuracy and integrity of hourly faculty member compensation, the current hourly faculty payment process should be documented and communicated to all those involved in the process (i.e. Division Chairs, Instruction Office, Human Resources, and Computer Services), to ensure adequate and appropriate knowledge of each participants responsibilities.





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# Payroll Application Recalculation of Payroll Transactions

Selection #	Pay Type		Pay Scale		Calculations		
	Salary	Hourly	Range	Step	Earnings	Deductions	Benefits
1	✓		✓	✓	✓	✓	✓
2	✓		✓	✓	✓	✓	✓
3	✓		✓	✓	✓	✓	✓
4	✓		✓	✓	✓	✓	✓
5	✓		✓	✓	✓	✓	✓
6	✓		✓	✓	✓	✓	✓
7	✓		✓	✓	✓	✓	✓
8	✓		✓	✓	✓	✓	✓
9		✓	✓	✓	✓	✓	✓
10		✓	✓	✓	✓	✓	✓
11		✓	✓	✓	✓	✓	✓
12		✓	✓	✓	✓	✓	✓
13		✓	✓	✓	✓	✓	✓
14		✓	✓	✓	✓	✓	✓
15		✓	✓	✓	✓	✓	✓

## Purpose

- Deloitte and Touche recalculated the earnings, deductions, and benefits of 15 random employees with the assistance of the SJDC Payroll Technician. The calculations were performed to provide reasonable assurance regarding the Payroll Application's ability to accurately compute payroll.

## Conclusion

- There were no errors or irregularities found during our recalculation of the 15 payroll transactions.





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# General Computer Controls Assessment

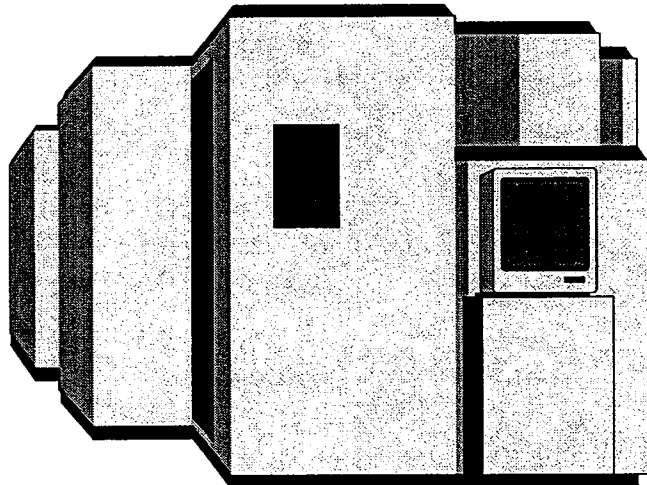


**Information Security**

**System Development & Maintenance**

**Data Center Operations**

**Information Systems Support**





San Joaquin Delta College

# Scope and Objectives of General Computer Controls Assessment

The scope and objective of the Macintosh Client/Server processing environment review was to assess the key environmental controls and management issues related to SJDC's new client/server processing environment.

Specifically, we have assessed the following areas:

- Macintosh Client/Server environment (System 2000): we assessed general computer controls related to the areas of information security, systems acquisition development and maintenance, computer operations, and information systems support. Within the System Support area we focused on the assessment of controls around problem tracking and resolution, network management, firewall implementation approach, remote access, and database administration.

The following slides outline our observations and recommendations resulting from our assessment of the general computer controls within SJDC's new client/server processing environment.





# General Computer Controls Assessment

## Observation #1

- All application developers/programmers have access to the **production** Smalltalk System 2000 application modules (“source code”) which provides the developers/programmers with the ability to make unauthorized or inappropriate changes to System 2000 applications.

## Recommendation

- Access to **production** Smalltalk System 2000 application modules (“source code”) should be restricted to appropriate change control personnel to prevent unauthorized or inappropriate changes to System 2000.

## Observation #2

- All application developers/programmers have the ability to submit program changes to the **production** Smalltalk System 2000 application modules. Program change control procedures are not in place to ensure that only authorized and tested program changes are submitted to the **production** environment.

## Recommendation

- Program change control procedures should be established to ensure that only authorized and tested program changes are submitted to the **production** environment. Appropriate change control procedures should address all aspects of change control including the approval and documentation of program changes, quality assurance, emergency change procedures, programming standards, etc.

## Observation #3

- All application developers/programmers have “super privilege” access to the System 2000 **production** database within ORACLE. This access privilege allows developers/programmers read, write, and update capabilities to System 2000 **production** data, which may result in the corruption or loss of student and financial record data.

## Recommendation

- Access to the ORACLE **production** database should be restricted to authorized database administration personnel to ensure the accuracy, validity, confidentiality and integrity of student and financial record data.





San Joaquin Delta College

# General Computer Controls Assessment

## Observation #4

- San Joaquin Delta College (SJDC) does not have a college-wide business continuity plan. In the event of a disaster, normal operations within the college's many departments may be interrupted. The lack of a college-wide business continuity plan for SJDC's various departments may prevent the departments from recovering for an extended period of time.

## Recommendation

- A formal Business Continuity Program should be initiated to begin the development of a college-wide business continuity plan. Such an effort should include the following:
  - ❖ the identification of critical business functions
  - ❖ a detailed business impact/risk assessment of critical business functions
  - ❖ a cost/benefit analysis of protecting critical business functions from the potential risks
  - ❖ documentation of a business continuity plan
  - ❖ training and testing of business continuity plan

## Observation #5

- SJDC does not have a college-wide information protection policy. The lack of a formal college-wide policy results in an increased risk of inconsistent information security practices throughout the college. In addition, the lack of a formal college-wide policy also results in inefficient and ineffective information security administration.

## Recommendation

- A formal college-wide information protection policy should be developed to ensure the proper protection of information and effective security administration. At a minimum the policy should address the following issues:
  - ❖ classification of information (i.e. sensitive, confidential, critical, etc.)
  - ❖ defined ownership and responsibility for information
  - ❖ protection strategies (i.e. information security procedures, business continuity plan, disaster recovery plan, etc.)
  - ❖ enforcement/compliance program (i.e. review of policy, monitoring and surveillance of compliance, incident reporting, etc.)





San Joaquin Delta College

# General Computer Controls Assessment

## Observation #6

- The computer room located in the Computer Services Department is unlocked during business hours. As such, unauthorized personnel may gain access to the computer processing facility, resulting in the loss or damage of computer hardware or the loss or corruption of student and financial record data.

## Recommendation

- Access to the computer room should be restricted to authorized personnel. The access restriction method should allow for ease of use, due to the high traffic in the computer room, while providing an adequate level of security. An appropriate level of access restriction may be achieved through the use of key-pad entry systems or a similar method.

## Observation #7

- The computer facility at SJDC does not have an uninterruptable power supply (UPS) for use in the event of a power outage. The lack of a UPS may cause significant processing down time or the disruption of batch processing in the event of a power outage.

## Recommendation

- SJDC should install an appropriate UPS to ensure the ability to properly complete processing and perform a proper shutdown of the system in the event of a power outage.





San Joaquin Delta College

# Internet Firewall Issues

## Observation #1

The Computer Services (CS) department of San Joaquin Delta College has segregated the student campus network apart from the financial and institutional network to help reduce the risk of students passively and/or actively gaining unauthorized access to the College's information resources such as financial and student record data. In addition, the CS department has recently acquired a firewall solution from Digital Equipment Corporation (DEC). The intention of the CS department is to implement the firewall between the College's Local Area Network and the "Internet." The proper installation and use of the firewall should provide the College with a level of security appropriate for the college environment. A firewall that is properly designed and configured will minimize the risk of having an Internet connection. However, a poorly implemented firewall will not provide adequate security and controls, and may result in management placing an inappropriate level of reliance on the firewall.

## Recommendation

Due to the significance of security implied by having a firewall system, Computer Services should ensure that the implementation of the firewall security is at a level acceptable to business practice standards, and that the daily administration of the firewall is performed and provides a level of assurance that break-in attempts would be identified and follow-up actions performed. Computer Services should consider the following, at a minimum, during the firewall implementation:

- Develop Acceptable Internet Use Policies for students and faculty
- Develop the necessary Operations Procedures for the firewall
- Configure for only the necessary Internet services
- Monitor audit logs on a daily basis
- Require one-time password authentication for inbound services
- Perform system Integrity checks on a weekly basis
- Perform system backups on a monthly basis
- Deny any inbound Internet services unless strict configuration parameters are defined and inbound actions are limited

Up-front decisions in network design, Internet services required, and an architectural design of the firewall system carry significant security implications. If considerations





# Internet Firewall Issues

for security are initiated early in the design process, sound security mechanisms and practices can help ensure that the continued business functions will not be impacted and that security will be in place to reduce unnecessary risk.

## Observation #2

The Local Area Network (LAN) that is currently being re-designed by the Computer Services (CS) will provide the College with a greater level of flexibility, manageability, and functionality. The re-design and migration of the LAN is the correct direction for the College, however, the new configuration of the LAN does present some risk. The new LAN relies upon a single hub which provides connectivity from all PCs and Macs to the servers running the critical student and financial applications. The hub does have flexibility and redundancy built within the device, however, an event causing the hub to shut down may result in a denial of service to servers and applications.

## Recommendation

Although it is understood that the cost of the hub prevents the College from acquiring backup devices, alternative approaches should be identified and reviewed for feasibility. Within the approach Computer Services should identify what systems are critical and how a secondary connection from the users workstation to those servers could be obtained.

