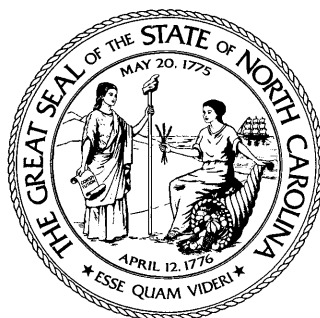


STATE OF NORTH CAROLINA



Special Report Supplement

YEAR 2000 INDEPENDENT VERIFICATION AND VALIDATION REPORT

ON MISSION CRITICAL COMPUTER APPLICATIONS

OFFICE OF THE STATE AUDITOR
RALPH CAMPBELL, JR.
STATE AUDITOR

OFFICE OF THE STATE AUDITOR

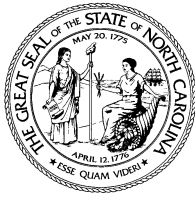


Ralph Campbell, Jr.
State Auditor

MISSION AND COMMITMENT

The mission of the Office of the State Auditor is to provide North Carolina's citizens and other users with **professional, independent evaluations** of the State's fiscal accountability and public program performance. Specifically, the Office of the State Auditor strives to assure that North Carolina state government is executing its management responsibility in compliance with applicable laws, rules, regulations and policies. Additionally, the Office of the State Auditor evaluates management controls and policies that should promote the efficient and effective use of public resources and assists state agencies in identifying areas of possible duplication.

In conducting these duties and responsibilities, the State Auditor is committed to thorough audits and examinations performed by a professional staff which result in useful and practical recommendations to improve services provided by North Carolina state government. Further, the State Auditor is committed to promoting cooperative efforts with those agencies and institutions under his statutory oversight.



STATE OF NORTH CAROLINA

Office of the State Auditor

2 S. Salisbury Street, Raleigh, NC
20601 Mail Service Center
Raleigh, NC 27699-0601
Telephone: (919) 807-7500
Fax: (919) 807-7647
Internet <http://www.osa.state.nc.us>

Ralph Campbell, Jr.
State Auditor

December 22, 1999

**The Honorable James B. Hunt, Jr., Governor
Members of the North Carolina General Assembly
North Carolina Department/Agency Heads
Citizens of the State of North Carolina**

Ladies and Gentlemen:

We are pleased to submit this special report supplement of the *Year 2000 Independent Verification and Validation Report on Mission Critical Computer Applications*. The objective of this project was to use independent resources to provide an additional level of assurance that the most mission critical computer applications for the State of North Carolina will be year 2000 (Y2K) ready at the turn of the century.

We issued our main report in November 1999 that included the results of independent verification and validation (IV&V) of 112 of the State's 126 mission critical computer applications. The IV&V results for the remaining 14 mission critical applications are included in this supplemental report. This report consists of an executive summary, project background, scope, approach, vendor selection, a summary of the results by department, and the results of the individual application assessments organized by department.

Detailed reports for each computer application reviewed were sent to the responsible department heads as they were completed to allow the departments sufficient time to address any application deficiencies found. For all applications in which deficiencies were found, the departments have submitted corrective action plans to address the deficiencies. The Office of the State Auditor has received verbal confirmation from most of the departments that they have implemented the action plans submitted. However, due to time limitations we did not confirm that these action plans have been implemented for each application. It is the departments' responsibility to ensure that the action plans submitted have been fully implemented.

We wish to express our appreciation to the Y2K Project Office personnel, the heads of the state departments, and their staffs for the courtesy, cooperation, and assistance provided to us during this very important project.

Respectfully submitted,

A handwritten signature in black ink that reads "Ralph Campbell, Jr." in a cursive style.

Ralph Campbell, Jr.
State Auditor

cc: Year 2000 Project Office

Year 2000 Readiness Disclosure



TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
BACKGROUND	5
PROJECT SCOPE.....	7
PROJECT APPROACH.....	9
CHOOSING AN APPROACH	9
PRIMARY Y2K IV&V PROCESS.....	9
ALTERNATE Y2K IV&V PROCESS	12
REPORTING PROCESS	12
IV&V VENDOR SELECTION.....	13
ORGANIZATIONAL REPORTING STRUCTURE	13
ASSIGNMENT OF Y2K IV&V PROJECTS.....	14
RESULTS.....	16
SUMMARY OF RESULTS OF THE Y2K IV&V FOR THE REMAINING 14 APPLICATIONS	16
RESULTS BY DEPARTMENT.....	17
<i>Department of Environmental and Natural Resources</i>	<i>17</i>
<i>Department of Health and Human Services</i>	<i>23</i>
<i>Department of Public Instruction</i>	<i>29</i>
<i>Department of Revenue.....</i>	<i>31</i>
<i>Department of Transportation.....</i>	<i>32</i>
<i>Employment Security Commission.....</i>	<i>33</i>
<i>General Assembly.....</i>	<i>35</i>
<i>North Carolina State University.....</i>	<i>36</i>
APPENDIX A	37
LIST OF Y2K IV&V VENDORS WITH CONTACT INFORMATION	37
APPENDIX B	38
SUMMARY LIST OF ASSESSMENT RESULTS REMAINING APPLICATIONS BY DEPARTMENT	38

EXECUTIVE SUMMARY

“Year 2000 Independent Verification and Validation Report On Mission Critical Computer Applications” (Referred to hereafter as the main Year 2000 IV&V report). In that report we

112 of the 126 most mission critical applications in the State of North Carolina. Fourteen applications were not ready for an IV&V assessment in time to be included in that report.

critical applications in this supplemental report.

The State of North Carolina plans to spend an estimated \$131 million to repair or remediate” and test the State’s computer applications so that they properly process dates before and after the year 2000 and between the twentieth and twenty-first centuries. As part

Department of Commerce Year 2000 Project Office approached State Auditor Ralph Campbell, Jr. and requested that his Office conduct an Independent Verification and

assurance that the State’s most mission critical computer applications would be year 2000 (Y2K) ready at the turn of the century. The State of North Carolina has demonstrated

2000 Independent Verification and Validation on such a broad scale.

The scope of this project included performing independent verification and validation of the

were identified through discussions with key business and information systems personnel in thirty-eight of the State’s departments (agencies, departments, offices, and universities) and

applications were excluded from our scope because the departments responsible for the applications already had plans to conduct an independent verification and validation project

report to present a more comprehensive picture of our State’s Y2K readiness. The results for one-hundred-and-twelve of the mission critical applications were reported in our main

for the remaining fourteen mission critical applications are included in this supplemental report.

assessment of the computer application source code to detect year 2000 errors. Doing so ensured thorough analysis of the application while reducing the need for significant support

long timelines associated with functional testing. In a few cases the application source code was not available for conducting an automated code scan, but a suitable test environment was available. For these few applications, OSA conducted functional testing to assess the Y2K Readiness of the application. For all applications that went through automated code assessment or functional testing, OSA rendered one of three opinions for the application: Y2K Ready, Y2K Ready with minor modifications, or Not Y2K Ready. These opinions were objectively driven by defined criteria involving the number of application errors found under each of the following categories: Emergency, High, Medium, or Low.

In some situations it was not possible to utilize the primary Y2K IV&V approach because the State did not have access to the application source code or a suitable test environment. For these applications, OSA used an alternate approach to complete the Y2K assessment. The alternate approach was to conduct a due diligence assessment to ensure that reasonable and prudent measures had been taken to ensure the Y2K readiness of the application. For these assessments, applications received one of the following opinions: Due Diligence Fully Demonstrated, Due Diligence Moderately Demonstrated, or Due Diligence Not Demonstrated. These opinions were driven by an assessment of the following: the application vendor Y2K Readiness statements, the application remediation approach, testing activities used to ensure the application is Year 2000 Ready, and the Y2K readiness of the application hardware, operating system, and associated software.

Using the methodology described in the previous two paragraphs has saved the State an estimated \$15 million because it leverages the use of automated source code assessment rather than relying on human resources to manually test each application. The approach is flexible enough to allow for functional testing or a due diligence assessment when code scanning was not feasible.

The Y2K IV&V report for each mission critical application was edited and approved by OSA, issued to the head of the department, and copied to the Y2K Project Office immediately after the completion of the assessment. This approach allowed the departments the opportunity to take immediate action on the errors found and bring the application into a Y2K ready condition as soon as possible. The Executive Summary section of the report was also sent to the Governor and all members of the Information Resource Management Commission. If the Y2K readiness opinion on the application was any opinion other than "Y2K Ready" or "Due Diligence Fully Demonstrated," the OSA requested that the department submit a corrective action plan to the Y2K Project Office and send a copy of the action plan to OSA.

To provide the necessary resources for a project of this magnitude, OSA procured the services of eight Y2K IV&V vendors. In addition, OSA procured the services of a project manager from an independent vendor to manage the day to day activities of the project. All of these resources operated under the professional management oversight of the Office of the State Auditor.

the remaining fourteen mission critical computer applications. We were unable to complete an IV&V assessment on the North Carolina State University's Contracts and Grants application will be installed in January 2000. The University has developed a business continuity plan, and we have recommended that they fully test the plan to ensure its viability

The table below lists each of the Y2K readiness opinions and the number of applications that received that Y2K readiness opinion.

Verification & Validation Assessments					Applications Reviewed
Y2K Ready	Y2K Ready Modifications	Not Y2K Ready	DD Demonstrated	DD Moderately Demonstrated	
5	5		2	0	13

In most cases, departments have already taken corrective action on applications that received cases, departments have submitted corrective action plans but have not yet implemented them. However, the departments will implement their action plans before the year 2000. applications will be Y2K Ready at the turn of the century.

It should be noted that due to time limitations OSA did not confirm that the action plans that the action plans submitted have been fully implemented.

Aside from the obvious benefits that this project has provided to the State of North this project has enabled us to prepare a much more complete and comprehensive list of mission critical computer applications for the State of North Carolina. In addition, by applications in each department, the department leadership grew more familiar with the information technology and systems that support their core business functions. Finally, in improved the functional and technical documentation for the system that was reviewed. These tools may be reused in the departments for training and analysis purposes both now

While this office is proud of the value added by this project we are cautious in our celebration. The scope of this project encompassed 126 of the State's 1120+ computer critical applications are Y2K compliant, but no analysis or remediation activity can provide a

100% assurance that an application will not experience some problems in the year 2000. However, we believe we have provided a high level of assurance at a reasonable cost to the State and believe further analysis would bear little fruit in comparison to the dollars required to do it.

BACKGROUND

The Year 2000 (Y2K) computer bug has presented an extraordinary challenge to industry, governments, and citizens throughout the industrialized world. According to Gartner Group, more than 600 billion dollars will be expended worldwide to repair or “remediate” computer applications so that they properly process dates before and after the year 2000 and between the twentieth and twenty-first centuries.¹ The State of North Carolina plans to spend a total of \$131 million on its Y2K remediation and testing.

The State of North Carolina began proactively addressing the Y2K computer bug as early as 1995, and in late 1996 the State established the Year 2000 Project Office to begin addressing the problem at a statewide level. In mid - 1997 the Secretary of Commerce established the statewide Year 2000 Steering Committee to oversee the assessment of the Y2K impact on the State. Additionally, this committee was responsible for the identification and implementation of solutions to the Y2K computer bug for state computer applications. The Steering Committee was made up of a cross-section of the State’s leaders from various agencies, offices, and universities. With the formation of the Year 2000 Steering Committee, the Year 2000 Project Office became the staff support for the direction established by the Year 2000 Steering Committee and was responsible for the day-to-day activities associated with the statewide effort. The director of the Year 2000 Project Office reported directly to the State’s Chief Information Officer, and the project was staffed with state employees and contract resources. In addition, state agencies, offices, and universities appointed a Year 2000 coordinator to address the Y2K concerns within their respective organizations and to act as a liaison between the organization and the Year 2000 Project Office.

While the state remained confident in the established sponsorship, organization, and approach chosen to address the Y2K issue, the Year 2000 Project Office recognized the need for an additional level of assurance that the State’s most mission critical computer applications would be Y2K ready at the turn of the century. In response to this need, the Department of Commerce requested that the Office of the State Auditor lead an independent verification and validation (IV&V) effort of the Y2K readiness of the State’s most mission critical computer applications. Independent verification and validation for Year 2000 compliance is a process whereby independent professionals confirm by examination, collection of objective evidence, and testing, that applications are capable of processing data correctly at the turn of the millennium and beyond.

¹ CNET Y2K web site at <http://www.cnet.com/Content/Reports/Special/Y2000/>, “The High Price of Y2K.”

On August 4, 1998, Lt. Governor Dennis Wicker, State Auditor Ralph Campbell, Commerce Secretary Rick Carlisle, and Chief Information Officer Rick Webb signed a Memorandum of Understanding (MOU) that defined the roles and responsibilities in assessing the Y2K readiness of the State's mission critical applications. The signing of this MOU was intended to accomplish the following:

- Significantly improve the possibility of compliant information systems through timely independent verification and validation (IV&V)
- Eliminate the potential for duplication of effort
- Ensure the independence, technical expertise, integrity and credibility demanded by citizens of North Carolina.

The MOU established that the Office of the State Auditor (OSA) and the Department of Commerce/Information Technology Services (ITS) would jointly develop specifications to retain the professional services necessary to independently verify and validate the Y2K readiness of the State's mission critical applications. The MOU further established that work performed by the IV&V vendors would be complimented by the oversight of OSA's professional audit personnel and management staff, and the funding for the contract professional services would be provided by ITS from the Year 2000 Special Fund. The State of North Carolina has demonstrated leadership with respect to this approach by being the only state that has performed Year 2000 Independent Verification and Validation on such a broad scale.

PROJECT SCOPE

In order to properly direct the IV&V resources, the Office of the State Auditor identified the State's "mission critical" applications by conducting an initial assessment of the State's 1100+ computer applications. Beginning with a list of all the computer applications from each state department (agency, department, office, or university), OSA interviewed key business and information systems personnel at 38 of the state departments to narrow the project scope to the State's most mission critical applications. Considerations used to determine which applications were the most mission critical included the following:

Considerations for Inclusion:

- Applications that were most closely aligned with the Department's core functions.
- Applications that would have a devastating impact on the Department's operations if the application failed and remained down for 3 months or more.

Considerations for Exclusion:

- Applications with proven manual work-arounds or alternate processing options were excluded from our scope.
- Commercial Off the Shelf (COTS) applications were considered lower risk because of the vendor's liability to remediate the software packages. However, we still included some COTS packages within our scope if they were clearly mission critical.

The department interviews resulted in narrowing the project scope to 132 mission critical applications at 29 North Carolina departments. Six applications were later removed from our list because the applications were either replaced by the agency with other applications, or because the applications were actually already covered under the IV&V of another identified mission critical application. *(A detailed listing of the six applications removed and the justification for removal was included in Appendix A of the main Year 2000 Independent Verification and Validation Report issued in November 1999.)* This left us with 126 mission critical applications for the State of North Carolina. *(A complete listing of the 126 mission critical computer applications was included in Appendix B of the main Year 2000 Independent Verification and Validation Report issued in November 1999.)*

Of the 126 mission critical applications, fourteen applications at the Department of Justice and four applications at the Department of Revenue were already being tested independently by outside vendors and were excluded from our scope to eliminate a duplication of effort. The vendor testing these applications was an approved Y2K IV&V vendor. To present a

more comprehensive picture of our state's Y2K readiness, we included the results of these assessments in our main Year 2000 IV&V report.

The General Assembly in the Legislative Branch also elected to perform IV&V of two mission critical applications through an independent vendor. However, the testing of these applications was delayed until after the end of the legislative session. The results of the IV&V of these two applications are included in this report. *(For a detailed list of the mission critical applications that were IV&Ved by individual department contract resources see Appendix C in the main Year 2000 Independent Verification and Validation Report issued in November 1999.)*

Of the 126 mission critical applications included in the overall IV&V scope, fourteen (including the two General Assembly applications) were not ready in time for us to complete the IV&V and include them in our main Year 2000 IV&V report issued in November. The results of the IV&V of these fourteen mission critical applications are included in this supplemental report.

PROJECT APPROACH

CHOOSING AN APPROACH

Numerous approaches exist for conducting Y2K IV&V. The simplest approach involves auditing the process used to do testing of the remediated applications to ensure that the process is sufficient to provide a degree of assurance that the application is Y2K ready. This approach does not involve any testing of the application and, therefore, does not offer a high degree of assurance. A more exhaustive approach may involve full scale regression testing of the applications by an independent party after the applications have been remediated and tested by the local IT shop or by a contract remediation vendor. This approach can be very time consuming and quite expensive.

The State of North Carolina Office of the State Auditor initially chose a Y2K IV&V approach that incorporated both automated code assessment and functional testing of mission critical computer applications. To validate the approach, the OSA project team initiated eight pilot Y2K IV&V projects in late 1998 (one with each Y2K IV&V vendor). During the course of the pilot projects, OSA realized that the functional testing part of this approach was requiring a higher degree of department subject matter expert support, a much greater amount of time for testing, and significantly more funding to support manual vendor testing resources.

Applying the lessons learned from the pilot projects, the Office of the State Auditor refined our Y2K IV&V approach to place less reliance on functional testing and to rely more heavily on leveraging automated tools. Doing so ensured thorough analysis of the application source code while reducing the need for significant support from the application's subject matter experts and minimizing both the high expenses and long timelines associated with functional testing. This approach is flexible in that it allows for functional testing of the application if needed. The approach includes management decision points throughout to ensure the State analyzes and tests the application only to the level necessary to provide reasonable assurance that the application is Y2K ready. This approach has proven to be very effective and efficient, providing a high degree of assurance at a reasonable cost to the State. Refining the methodology as we did saved the State an estimated \$15 million by leveraging the use of automated source code assessment rather than relying on human resources to manually test the application.

PRIMARY Y2K IV&V PROCESS

The refined Y2K IV&V approach, conducting a source code scan and completing functional testing if needed, was used for all mission critical applications maintained by the State and

for all vendor-provided applications for which the State had access to application source code.

To ensure the least amount of disruption to the department personnel, OSA assigned one Y2K IV&V vendor to each department when possible. (See Appendix A for a list of Y2K IV&V vendors with contact information.) Vendors worked with the department personnel to schedule the IV&V activities for each of the mission critical computer applications within our scope. For each application, the vendor conducted an initial assessment of the application to develop a statement of work, which included a project plan and a not-to-exceed cost estimate. Once the OSA approved the statement of work, the vendor completed both a code analysis phase and a functional analysis phase.

The purpose of the **code analysis** was to run the application source code through an automated code analysis tool to identify any errors associated with handling dates affected by the year 2000. The purpose of the **functional analysis** was to identify the core functionality delivered by the application. Once the code analysis was complete, the vendor reviewed the resulting errors to see if any had an impact on the core functions identified in the functional analysis. Vendors were asked to identify the specific business impact that each of the errors would have on the application if not corrected. Once the impact was determined, errors were ranked into one of the following impact severity categories:

Emergency – Errors that cause a stoppage in IV&V testing are classified as "Emergency." Emergency is a different type of error than the other errors and is not really higher than a "High" impact error. Emergency errors are usually fixed, and then the testing is re-run before the course of the IV&V is over. Therefore, Emergency errors probably will have no effect on the opinion of Y2K Readiness of the application since they have been corrected and retested during the IV&V.

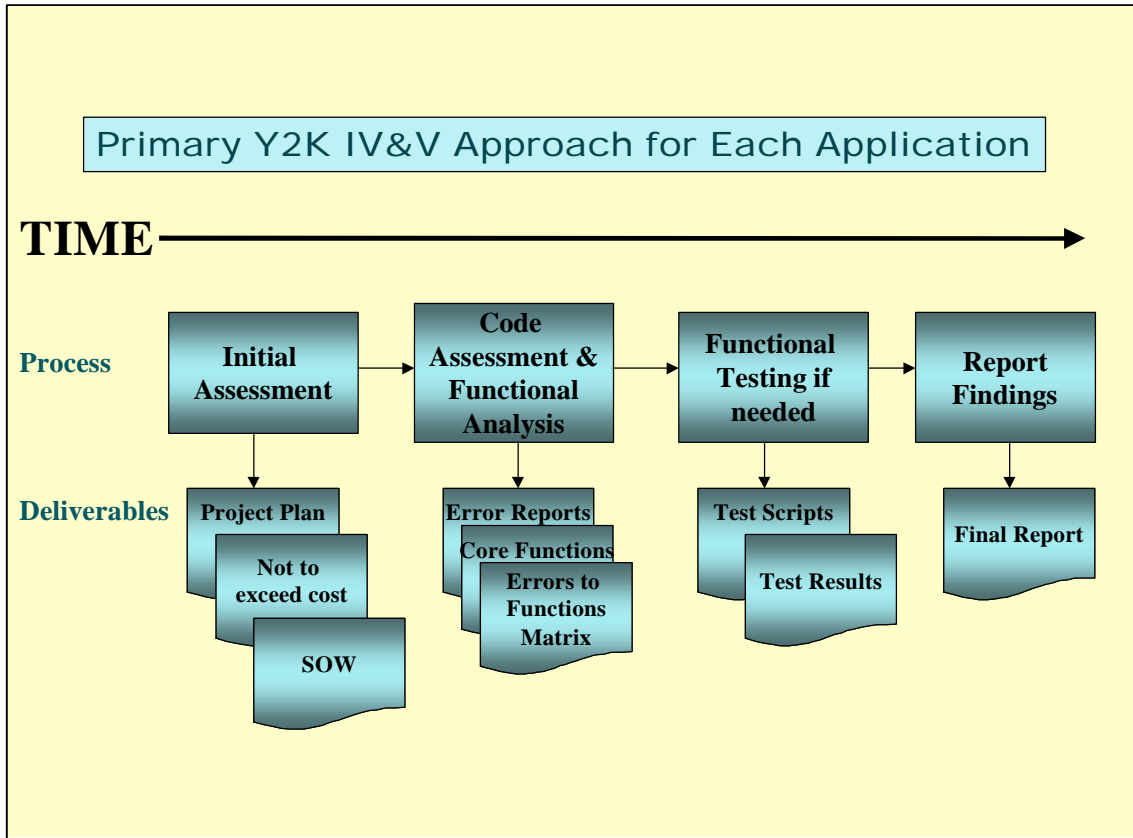
High - Errors that have significant functional impact on the application are classified as "High." These errors, if not corrected, would cause business interruption and/or corruption of mission critical data in the application. Also, errors that are highly visible and potentially embarrassing to the State may be classified as High.

Medium - Errors that have functional impact on an application but do not meet the criteria to be classified as "High" are classified as "Medium." This will be the classification most commonly used for errors that impact functionality in a less than severe manner. This type error must be fixed to ensure it does not adversely impact application functionality in the year 2000 and beyond.

Low - Any errors that are mainly cosmetic in nature (affect the manner that dates appear on screen or on reports) or have a very minor impact should be classified as "Low."

No Impact – Items that are initially flagged as errors during code scanning or initial assessment that are later found to have no real functional impact on the application are classified as "No Impact."

Once all errors had been ranked, OSA worked with the vendor and the department to determine whether or not functional testing would be required to further assess the Y2K readiness of the application. Functional testing was only executed for applications with errors having significant impact on core functionality.



After the Y2K IV&V vendors identified any application errors and had assigned an error classification, OSA met with the vendor and the department to discuss the results of the IV&V. The purpose of this meeting was to discuss each of the errors and agree on the classification of each error. Once all parties agreed on the classification of each error, the overall Y2K readiness opinion could be determined by the number of errors found in each error classification. Using this information, the vendor developed the Y2K IV&V final report for the application under review.

Applications received one of the following opinions:

- **Y2K Ready:** Applications with no errors, only "low" impact errors, or with both "low" and "emergency" errors (assuming the emergency errors have been corrected and retested).

- **Y2K Ready with minor modifications:** Applications with any "Medium" impact errors but no "High" impact errors.
- **Not Y2K Ready:** Applications with any "High" impact errors.

ALTERNATE Y2K IV&V PROCESS

In some situations it was not possible to utilize the primary Y2K IV&V approach because the State did not have access to the application source code or a suitable test environment. For these applications, OSA used an alternate approach to complete the Y2K assessment. The alternate approach was to conduct a due diligence assessment to ensure that reasonable and prudent measures had been taken to ensure the Y2K readiness of the application. For these assessments, applications received one of the following opinions:

Due Diligence Fully Demonstrated: The application vendor has fully documented and demonstrated reasonable and prudent measures to ensure Y2K compliance.

Due Diligence Moderately Demonstrated: The application vendor has documented and demonstrated some reasonable and prudent measures to ensure Y2K compliance.

Due Diligence Not Demonstrated: The application vendor has not documented nor demonstrated reasonable and prudent measures to ensure Y2K compliance.

This alternate approach generally involved review of application vendor Y2K Readiness statements, an assessment of the application remediation approach, and an assessment of the testing activities used to ensure the application is Year 2000 ready. The approach also included a review of application computer hardware and operating systems to ensure the vendor had proposed a reasonable approach to ensure Y2K readiness.

REPORTING PROCESS

Each report was edited and approved by OSA and issued to the head of the department and copied to the Y2K Project Office immediately after the completion of the assessment. This approach allowed the department the opportunity to take immediate action on the errors found to bring the application into a Y2K ready condition as soon as possible. The Executive Summary section of the report was also sent to the Governor and all members of the Information Resource Management Commission (IRMC). If the Y2K readiness opinion on the application was any opinion other than "Y2K Ready" or "Due Diligence Fully Demonstrated," the OSA requested that the department submit a corrective action plan to the Y2K Project Office and send a copy of the action plan to OSA.

IV&V VENDOR SELECTION

The Office of the State Auditor worked with the Department of Commerce's Y2K Project Office to develop a Request for Proposal (RFP) for procuring Independent Verification and Validation (IV&V) services for year 2000 readiness of the State's most mission critical computer applications.

Nine vendors responded to the RFP, and after evaluation of each vendor's credentials, all nine were accepted as eligible vendors to provide Y2K IV&V services. One of the nine vendors eventually decided to forgo working with the State on this project because they were not comfortable with the unlimited liability clause in the contract. The remaining eight Y2K IV&V vendors provided the primary staffing for the Y2K IV&V project. (See Exhibit 1 for a list of the approved Y2K IV&V vendors.) . *(See Appendix A for a list of Y2K IV&V vendors with contact information.)*

Exhibit 1

Approved Y2K IV&V Vendors

Affiliated Computer Services (ACS)
Computer Business Solutions, Inc. (CBSI)
HMS Company
IMI Systems
Keane
OAO
RAH Software Technologies
Sapiens

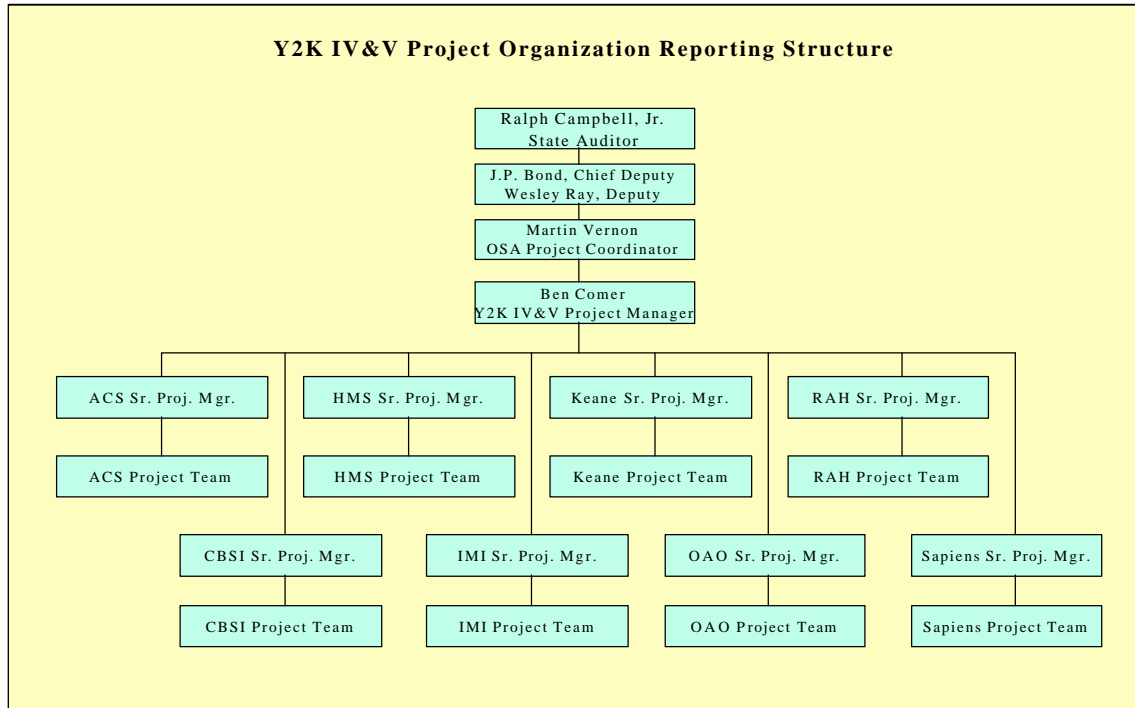
OSA procured the services of a project manager from an independent vendor on the State's SIPS Convenience Contract to assist in evaluation of the vendors responding to the RFP and to manage the day to day activities of the project once activities began. These services were provided by TPMC through their subcontractor, NewSouth Technologies, Inc.

ORGANIZATIONAL REPORTING STRUCTURE

OSA assigned Mr. Martin Vernon, IS Audit Manager, to act as the OSA project coordinator and to oversee all project team activities. The Y2K IV&V Project Manager, Mr. Ben Comer, reported directly to Mr. Vernon. Each of the Y2K IV&V vendors assigned a Senior Project Manager that reported to Mr. Comer and coordinated all of the assigned work for that

particular vendor. The Senior Project Managers typically had Project Managers or Project Leaders that were in charge of each of the individual IV&V projects for a particular mission critical computer application. (See Figure 1 for an organizational chart of the reporting structure on the project.)

Figure 1



ASSIGNMENT OF Y2K IV&V PROJECTS

In order to minimize the level of disruption to personnel at the state departments, when possible OSA assigned each department to one and only one Y2K IV&V vendor. Once a department had been assign to a vendor, the vendor conducted all Y2K IV&V activities for all mission critical applications within the department. We made two exceptions to this mode of operation when two of the assigned vendors were unable to provide the Y2K IV&V services for particular applications in a cost competitive manner.

The assignment of departments to vendors was affected by the number and complexity of mission critical computer applications that existed in each department. The departments with larger and more complex applications were assigned to the vendors that most clearly demonstrated an ability to successfully complete the work in a cost-effective manner. OSA determined vendor qualifications based on the following criteria:

- Corporate Qualifications for doing Y2K IV&V (demonstrated ability)

- Past track record (successful completion of projects with high value added)
- Experience of corporation and staff
- Staff availability
- Independence (Corporation had no conflicting interests at a particular department)

For each application under review at each department, the selected vendor prepared a Statement of Work (SOW) outlining the Y2K IV&V work to be completed and providing a not-to-exceed cost estimate and the project plan for completing the work within a specified time frame. In each case, OSA evaluated the SOW for reasonableness of approach and cost effectiveness and either approved the SOW, negotiated changes to the SOW, or reassigned the task to another vendor due to an inability of the assigned vendor to deliver the requested services in a cost competitive manner.

RESULTS

SUMMARY OF RESULTS OF THE Y2K IV&V FOR THE REMAINING 14 APPLICATIONS

Below is a summary of the results of the Y2K IV&V assessments for thirteen of the remaining fourteen mission critical computer applications. We were unable to complete an IV&V assessment for North Carolina State University's Contracts and Grants application because it was not yet installed in production. As described in the Approach section, each application that went through a Verification and Validation Assessment received one of the following opinions: Y2K Ready, Y2K Ready with Minor Modifications, or Not Y2K Ready. Alternatively, applications that went through a due diligence assessment received one of the following opinions: Due Diligence Fully Demonstrated, Due Diligence Moderately Demonstrated, or Due Diligence Not Demonstrated. The table below lists each of these Y2K readiness opinions and the number of applications that received that Y2K readiness opinion.

Y2K Readiness Assessment Opinions at the Time of Review						Total Applications Reviewed for State
Verification & Validation Assessments			Due Diligence Assessments			
Y2K Ready	Y2K Ready with Minor Modifications	Not Y2K Ready	DD Fully Demonstrated	DD Moderately Demonstrated	DD Not Demonstrated	
5	5	1	2	0	0	13

(Please find a consolidated list of the summary of assessment results by department for these thirteen applications at Appendix B).

RESULTS BY DEPARTMENT

The information presented below provides a summary by each state department and the high level results of the Y2K readiness assessment for each of the remaining mission critical applications within the department.

Department of Environmental and Natural Resources

Summary of Results for the Department of Environmental and Natural Resources

Below is a table that summarizes the results of the Y2K IV&V assessments for remaining mission critical applications at the Department of Environmental and Natural Resources (DENR).

Y2K Readiness Assessment Opinions at the Time of Review						Total Applications Reviewed for Department
Verification & Validation Assessments			Due Diligence Assessments			
Y2K Ready	Y2K Ready with Minor Modifications	Not Y2K Ready	DD Fully Demonstrated	DD Moderately Demonstrated	DD Not Demonstrated	
0	1	1	0	0	0	2

Results by Application for the Department of Environmental and Natural Resources

Below is a summary of the Y2K readiness assessment results for the remaining mission critical computer applications at the Department of Environmental and Natural Resources.

Drinking Water Compliance Monitoring System

The Drinking Water Compliance Monitoring System (DWCMS) is a statewide automated Public Water Supply (PWS) Monitoring System. The system provides functions to maintain PWS system information, record analysis results, provide verifications, perform compliance activities, generate reports, collect fees, and issue permits. In addition, the system serves as a database for facility and owner/operator information related to treatment plants and water related service providers.

Our procedures included an initial assessment, functional analysis, code analysis, and error analysis of the DWCMS application. Based on the results of these procedures, the DWCMS application appears to be Not Y2K Ready.

Below is a summary of the types of errors found during the course of our assessment:

Type of Error	Error Classification			
	Emergency	High	Medium	Low
Cobol	0	16	10	5
Focus	0	84	8	472
Y2K Focus	0	53	3	31
Total Number Errors	0	153	21	508

Note: At the time of this writing, the Y2K FOCUS was not part of the production application. This code is planned to replace the COBOL on January 1, 2000, and therefore, was included in this IV&V assessment. For the purpose of this report, errors in the Y2K FOCUS are identified and assigned a 'would be' impact on functionality assuming the code was put into production as is.

The following is a high level description of the errors found and the impact on the functionality of the DWCMS application:

COBOL HIGH IMPACT ERRORS

LITERAL DATES AND CENTURY ASSIGNMENTS

There is one instance where the century has an unconditional assignment value of '19'. This will produce a file date of 1900 in year 2000 when formatting the violation file and enforcement file for conversion to the new format.

There is one instance where the century is assigned an initial value of '19'. This is a general utilities program that eliminates duplicate records and will not function correctly in year 2000.

DATE VALUE COMPARISON AND CALCULATION

There are three instances in which a range of records is selected between two dates that do not contain the century. This selection will be wrongly performed on data ranging between the 20th and 21st centuries when performing compliance activities.

There is one instance where a comparison is made between two dates that do not contain the century. This will produce erroneous information in comparisons of dates ranging between the 20th and 21st centuries when performing compliance activities.

There are two instances where a calculation is being performed on a date field that does not contain the century. This will fail in year 2000 when performing report generation activities for the EPA.

There are eight instances in which a comparing record contains a two-digit year. This will produce erroneous results in comparisons of dates ranging between the 20th and 21st centuries when performing report generation activities for the EPA.

COBOL MEDIUM IMPACT ERRORS**PIVOT YEAR VALUES**

There are four instances where a hard-coded pivot year of 85 is assigned. This is noted because the standard pivot year used throughout the application is 70, and therefore, may produce erroneous results when performing compliance activities.

There are two instances where a hard-coded pivot year of 85 is assigned. This is noted because the standard pivot year used throughout the application is 70, and therefore, may produce erroneous results for data dated between 1971 and 1984 when performing report generation activities.

NON-COMPLIANT DATES IN SORTS

There are four instances in which ordering is done on a two-digit year at the first field. This will sort incorrectly on data ranging between the 20th and 21st centuries when performing report generation activities for the EPA.

COBOL LOW IMPACT ERRORS

We noted five low impact errors that are cosmetic in nature (affect the manner that dates appear in the screens or reports) or have a very minor impact on the application functionality. The Agency may wish to consider correcting these errors to improve the cosmetics and accuracy of the application. However, these errors do not impact the overall Y2K readiness opinion of the application.

FOCUS HIGH IMPACT ERRORS**DATE VALUE COMPARISON AND CALCULATION**

There are sixty-one instances where a comparison is made between two dates that do not contain the century. This will cause the edits for acceptable data to fail on data ranging between the 20th and 21st centuries when recording analysis results.

There are ten instances where a comparison is made between two dates that do not contain the century. This will produce erroneous information on data ranging between the 20th and 21st centuries when performing compliance activities.

There are six instances in which a calculation is performed on a two-digit year that does not contain the century. This will fail in year 2000 when performing compliance activities.

There are three instances where a comparison is made between two dates that do not contain the century. This will fail on data ranging between the 20th and 21st centuries when performing approvals, certifications, and updates to PWS system information.

There are two instances in which a calculation is performed on a two-digit year that does not contain the century. This will fail in year 2000 when performing approvals, certifications, and updates to PWS system information.

There is one instance where a comparison is made between two dates that do not contain the century. This will fail on data ranging between the 20th and 21st centuries when performing activities related to issuance of permits and collection of fees.

MISCELLANEOUS

There is one instance where the year is being extracted to the century variable. This will produce a backward date error when performing activities related to issuance of permits and collection of fees.

FOCUS MEDIUM IMPACT ERRORS

DATE VALUE COMPARISON AND CALCULATION

There are five instances in containing a subtraction from a two-digit year that does not contain the century. This will fail in year 2000 when performing report generation activities.

There are two instances where a comparison is made between two dates that do not contain the century. This will fail on data ranging between the 20th and 21st centuries when performing report generation activities.

There is one instance where a comparison is made between two dates that do not contain the century. This will fail on data ranging between the 20th and 21st centuries when performing activities related to issuance of permits and collection of fees.

FOCUS LOW IMPACT ERRORS

We noted four hundred and seventy-two low impact errors that are cosmetic in nature (affect the manner that dates appear in the screens or reports) or have a very minor impact on the application functionality. The Agency may wish to consider correcting these errors to improve the cosmetics and accuracy of the application. However, these errors do not impact the overall Y2K readiness opinion of the application.

Y2K FOCUS HIGH IMPACT ERRORS

DATE VALUE COMPARISON AND CALCULATION

There are twelve instances where a calculation is being performed on a date field that does not contain the century. This would fail in year 2000 when performing report generation activities.

There are six instances where a comparison is made between two dates that do not contain the century. This would fail on data ranging between the 20th and 21st centuries when performing report generation activities.

There are ten instances where a calculation is being performed on a date field that does not contain the century. This would fail in year 2000 when performing compliance activities.

NON-COMPLIANT DATES IN KEY STRUCTURES

There are nineteen instances where two-digit year variables that do not contain the century are used as a key to group records. This would cause incorrect groupings on data ranging between the 20th and 21st centuries when performing report generation activities.

There are six instances where two-digit year variables that do not contain the century are used to create a key value range. This range would be incorrect in year 2000 when performing compliance activities.

Y2K FOCUS MEDIUM IMPACT ERRORS**NON-COMPLIANT DATES IN KEY STRUCTURES**

There are two instances where two-digit year variables that do not contain the century are used to create a key value range. This range would be incorrect in year 2000 when performing compliance activities. These two instances are not used any further in the application, and therefore, have been given the medium impact assignment.

There is one instance in which an assignment of '010100' is given to a date variable using the two-digit year. This would not function correctly in the 21st century when performing report generation activities because it will not sort or compare correctly.

Y2K FOCUS LOW IMPACT ERRORS

We noted thirty-one low impact errors that are cosmetic in nature (affect the manner that dates appear in the screens or reports) or have a very minor impact on the application functionality. The Agency may wish to consider correcting these errors to improve the cosmetics and accuracy of the application. However, these errors do not impact the overall Y2K readiness opinion of the application.

The Department of Environmental and Natural Resources has submitted a corrective action plan to address the 153 high impact errors and 21 medium impact errors and states that the application now appears Y2K Ready.

North Carolina Agriculture Cost Share Program

The North Carolina Agriculture Cost Share Program (ACSP) provides the Division of Soil and Water Conservation (DSWC) with the capabilities to process Best Method Practices (BMPs) applications, reimbursement for installing BMPs, BMPs site inspections notification and tracking, and tracking compliance and maintenance of BMPs.

Our Independent Validation and Verification approach included an initial assessment, manual functional analysis, automated and manual code analysis, and error compilation of the ACSP system. Based on the results of these procedures, the ACSP appears to be Y2K Ready with Minor Modifications.

Below is a summary of the types of errors found during the course of our assessment:

Type of Error	Error Classification			
	Emergency	High	Medium	Low
Oracle	0	0	8	0
Client/Server	0	0	4	0
Java	0	0	1	0
Access	0	0	0	4
VB	0	0	0	0
Total Number Errors	0	0	13	4

MEDIUM IMPACT ERRORS

The eight medium impact errors associated with the Oracle system components are a result of using an older non-compliant version of the Oracle database server (version 7.3.2). According to Oracle, upgrading the Oracle database server to version 8.0 would resolve these errors.

The four medium impact errors associated with the Client/Server components including Internet Information Server (IIS), ODBC (Open Database Connectivity), Active Server Pages (ASP), and Active Data Objects (ADO) are due to dependencies on other non-compliant system components Oracle and Windows NT. The upgrade of the Oracle database server to version 8.0 (recommended above) would remove two of the medium Client/Server errors associated with the ODBC and ADO components. The other two medium Client/Server errors require the Windows NT 4.0 server to be upgraded to Service Pack 4 or higher (the server is currently running Windows NT 4.0, Service Pack 3).

The medium impact error associated with the Java component is a result of the system being compiled and constructed using a non-compliant version of Sun Microsystems' Java Development Kit (JDK version 1.1.5). It is recommended that the system be re-compiled with a compliant version of the Java Development Kit (JDK 1.1.6 or above).

LOW IMPACT ERRORS

We noted four low impact errors dealing with the Microsoft Access 97 reporting component that has a very minor impact on application functionality. The Agency may wish to consider correcting these errors to improve the cosmetics and accuracy of the application. However, these errors do not impact the overall Y2K readiness opinion of the application.

The Department of Environmental and Natural Resources has submitted a corrective action plan to address the thirteen medium impact errors. They are in the process of making the corrections and report that the corrections will be completed before the end of the year to ensure that the application appears Y2K Ready.

Department of Health and Human Services

Summary of Results for the Department of Health and Human Services

Below is a table that summarizes the results of the Y2K IV&V assessments for the remaining mission critical applications at the Department of Health and Human Services.

Y2K Readiness Assessment Opinions at the Time of Review						Total Applications Reviewed for Department
Verification & Validation Assessments			Due Diligence Assessments			
Y2K Ready	Y2K Ready with Minor Modifications	Not Y2K Ready	DD Fully Demonstrated	DD Moderately Demonstrated	DD Not Demonstrated	
0	2	0	0	0	0	2

Results by Application for the Department of Health and Human Services

Below is a summary of the Y2K readiness assessment results for the remaining mission critical computer applications at the Department of Health and Human Services.

Eligibility Information System

The Eligibility Information System (EIS) is a joint Work First (Temporary Assistance for Needy Families - TANF) and Medicaid system. It also supports the State's Special Assistance (SA) program. EIS allows a county worker to establish an application, approve or dispose of the application, and perform maintenance on new or existing cases. The EIS system then produces client notices, checks, Medicaid cards, and various management reports. It also provides TANF and Medicaid information to a number of State and private systems.

Our procedures included an initial assessment, functional analysis, code analysis, and error analysis of the EIS application. Based on the results of these procedures, the EIS application appears to be Y2K Ready with minor modifications.

Below is a summary of the types of errors found during the course of our assessment:

Error Classification	Emergency	High	Medium	Low
Number of Errors	0	0	29	111

The following is a high level description of the errors found and their respective impact on the functionality of the EIS application:

MEDIUM IMPACT ERRORS**LITERAL DATES AND CENTURY ASSIGNMENT**

There are five instances in which the century is assigned an unconditional value '19'. One occurrence is found within a screen used for completing new applications. One occurrence is found within a food stamps inquiry only screen. Two occurrences are found in a program that handles the relational edits in the M-QB (Medicaid- Qualified Beneficiary) aid program category. The last occurrence is found in a sorting program as part of the display.

DATE VALUE COMPARISON AND CALCULATION

There are two instances of a subtraction being performed from a two-digit year. One calculation is used for determining month-end in a program that formats and prints transfer notice routines. The other calculation is used in a program that prints the noncompliance remedial fine register for waived fines now being issued.

There is one instance of a six-digit year being subtracted from an eight-digit year, and one instance of a six-digit year being subtracted from another six-digit year. These calculations are used to calculate the process time and are found in a program that generates noncompliance remedial fines.

There is one instance of a five-digit date being compared to a seven-digit date. This comparison is used to select records from a database and is found in a program that deals with managed care county conversion.

There are three instances of comparisons being performed on date fields with inconsistent formats. One comparison is used to detect a bad or missing date when keying in a new application or re-application. The other two comparisons are found in a program that computes warrant distributions and summarizes the output record. One is used to set the latest date, and the other is used in a read.

There is one instance of a comparison being performed in which the outcome should change the entire date. However, the century is not included in the change. This occurs while building a register file in a program that deals with the AFDC TR end-of-period term notice register.

There are three instances of comparisons being performed between two-digit years. One comparison is used to validate dates in a program that creates penalty checks that were held due to a county request for a waiver of penalties. One comparison is used in a utility/driver program, and one comparison is used in a data manipulation/verification/collection program.

There is one instance of a comparison being performed with a date whose format is unknown. This occurs in a program that handles the relational edits for aid program category S-AD (Special Assistance- Aid to the Disabled).

DATE OFFSETS

There is one instance in which the month portion of one date field is being moved to the day portion of another date field. There is another instance in which a date is being improperly moved into a date field with a different format. Both occur in a program that is used in the update function of file manipulation.

There is one instance in which parts of a date field are being moved improperly. This date is used to validate records and occurs in a program that terminates MQB-E cases effective 12/31/98.

There is one instance of a seven-digit date being moved to an eight-digit field. This occurs in a read as part of a program that creates a before and after SDX (State Date Exchange) transaction file for all SDX transactions.

There is one instance of an eight-digit date being moved to a seven-digit field. This occurs in a date routine section of a program that creates 8125 transactions (used to approve pending applications and to make changes to an existing case).

There is one instance of a four-digit date being moved to a two-digit field. This occurs in the check processing section of a program that creates penalty checks that are held due to a county request for a waiver of penalties.

There is one instance of an eight-digit date being moved to a six-digit date field. This occurs in a date validation routine within a program that handles updating run-control records for operations.

There is one instance of a four-digit date being moved to a six-digit field. This occurs in the "housekeeping" section of a program that handles the creation function of file manipulation.

There is one instance of a five-digit date being moved to a seven-digit field. This date is used in record selection within a program that handles managed care county conversion.

NON-COMPLIANT LEAP YEAR CALCULATIONS

There is one instance in which a leap year calculation is performed on a two-digit year. This occurs in a program that handles Medicaid eligibility inquiry.

MISCELLANEOUS

There is one instance in which the input and output variable are off by two bytes. This will result in a truncation and occurs in a Bridge Utility program.

LOW IMPACT ERRORS

We noted one hundred and eleven low impact errors that are cosmetic in nature (affect the manner that dates appear in the screens or reports) or have a very minor impact on the application functionality. The Agency may wish to consider correcting these errors to improve the cosmetics

and accuracy of the application. However, these errors do not impact the overall Y2K readiness opinion of the application.

The Department of Health and Human Services has submitted a corrective action plan to address the 29 medium impact errors and 111 low impact errors and states that the application now appears Y2K Ready.

Health Services Information System

The main function of the Health Services Information System (HSIS) is to collect data on several Health Department administered programs, client demographics, billing, appointments, accounts receivable, and staffing. The data is then used to meet the reporting requirements of the state and federal agencies that fund these services. The system enables the Health Departments to run approximately 150 reports and print them on their local printers. The data collected is then sent to Medicaid for reimbursement for these services.

Our procedures included an initial assessment, functional analysis, code analysis, and error analysis of the HSIS application. Based on the results of these procedures, the HSIS application appears to be Y2K Ready with minor modifications.

Below is a summary of the types of errors found during the course of our assessment:

Error Classification	Emergency	High	Medium	Low
Number of Errors	0	0	38	13

The following is a high level description of the errors found and the impact on the functionality of the HSIS application:

MEDIUM IMPACT ERRORS

LITERAL DATES AND CENTURY ASSIGNMENT

There is one instance in which the literal '19' is always assigned as the century. This occurrence is found in a program that deals with "Compliance Binds" only (i.e., fraud), and although it is not a threat to the overall performance of HSIS it would not perform properly in the year 2000.

DATE VALUE COMPARISON AND CALCULATION

There is one instance of a comparison being performed between two dates where one has the century and one does not. This comparison is used to find a range of dates dealing with Maternal Health appointment records and will not function properly before or after the millennium. In this same function, and using one of the same date fields, there is one occurrence of a subtraction being performed on a two-digit year. This would fail in the year 2000 when dealing with Maternal Health activities.

There are six instances of comparisons being performed on two dates that do not contain the century. This will produce erroneous information in comparisons of dates ranging between the 20th and the 21st centuries when dealing with follow-up visit information, and various informational and statistical reports.

There are three instances in which comparisons are being performed between two dates in which one has the century and one does not. (They both actually have the century. However, the program is written so that the century field is not included in one of the date fields.) This will produce erroneous information in comparisons of dates ranging between the 20th and the 21st centuries when dealing with statistical reports.

There is one instance in which a comparison is performed with the wrong logical operator. This could produce erroneous information in the Holiday Schedule aspect of the Appointments function and will not function properly before or after the millennium.

There is one instance of a comparison being performed on dates that do not include the century. This will produce erroneous information in comparisons of dates ranging between the 20th and the 21st centuries on the menu map if a standard voucher issuance is requested.

There is one instance of subtraction from a year that does not include the century. This occurs in the program that performs the WIC Voucher Issuance Edits and will produce erroneous information when dealing with dates in the year 2000.

DATE OFFSETS

There are three instances in which sections of date fields are being moved incorrectly into sections of other date fields. Two of these occurrences would impact the Data Unit Selections (application technical administration functions), and one would impact Accounts Receivable. None of them will function properly before or after the millennium.

There are two instances in which the result of dates being moved is incorrect due to inconsistent date field definitions. These occurrences will produce erroneous information when dealing with statistical reports in the year 2000 and beyond.

There are eight instances in which dates with centuries are moved to fields without them, and in which dates without centuries are moved to fields with them. These occurrences could produce erroneous information dealing with Accounts Receivable and various informational reports before or after the year 2000.

There are two instances in which the year part of a date is overwritten by the century part of the date. This occurrence would cause erroneous information to be reported on Billing and Accounts Receivable reports in the year 2000 and beyond.

NON-COMPLAINT DATES IN SORTS

There is one instance in which a sort is done on dates and does not take the century into consideration. This will produce erroneous information in sorts of dates ranging between the 20th and the 21st centuries dealing with Issuance reports.

There is one instance of a sort being done on a two-digit year. This will produce erroneous information in the year 2000 and beyond with data ranging between the 20th and 21st centuries when producing Breast Cancer Follow Up reports.

MISCELLANEOUS

There is one instance in which if the year is equal to "00," then the date is understood to have no value instead of being interpreted as "2000." This will produce erroneous information in the year 2000 and will affecting the Patient Alpha Search Screen.

There are two instances of dates that are only partially defined in a compliant manner (i.e., The field name has been changed to reflect remediation, but the size of the field is still non-compliant.) One occurrence will affect the Appointment section of the application, and the other occurrence will affect Accounts Receivable in the year 2000 and beyond.

There is one instance of a date variable with the year and century defined twice. This could produce erroneous information with the WIC Certification Termination Due List before and after the millennium.

There are two instances in which temporary code has been put in place until the VSAM expansion is completed. This code will need to be remediated again at that time to handle the expansion. Otherwise, it may cause erroneous information in the year 2000 and beyond within the Nutritional Assessment Due report and the Certification Missed Appointment report.

LOW IMPACT ERRORS

We noted thirteen low impact errors that are mainly cosmetic in nature (affect the manner that dates appear on screen or on reports) or have a very minor impact on the application functionality. The Agency may wish to consider correcting these errors to improve the cosmetics and accuracy of the application. However, these errors do not impact the overall Y2K readiness opinion of the application.

The Department of Health and Human Services has submitted a corrective action plan to address the 38 medium impact errors and 13 low impact errors and states that the application now appears Y2K Ready.

Department of Public Instruction

Summary of Results for the Department of Public Instruction

Below is a table that summarizes the results of the Y2K IV&V assessments for the remaining mission critical applications at the Department of Public Instruction.

Y2K Readiness Assessment Opinions at the Time of Review						Total Applications Reviewed for Department
Verification & Validation Assessments			Due Diligence Assessments			
Y2K Ready	Y2K Ready with Minor Modifications	Not Y2K Ready	DD Fully Demonstrated	DD Moderately Demonstrated	DD Not Demonstrated	
4	0	0	0	0	0	4

Results by Application for the Department of Public Instruction

Below is a summary of the Y2K readiness assessment results for the remaining mission critical computer applications at the Department of Public Instruction.

Cash Management Application

The Cash Management Application is used by the Local Education Agencies (LEAs) and Charter Schools to request and approve disbursements of funds for facilities related expenses. Requests are processed via a batch process that generates a data feed to the appropriate disbursement system at the Office of State Treasurer.

Our procedures included an initial assessment, functional analysis, code analysis, and error analysis of the Cash Management Application. Based on the results of these procedures, the Cash Management Application appears Y2K Ready.

Below is a summary of the types of errors found during the course of our assessment:

Error Classification	Emergency	High	Medium	Low
Number of Errors	0	0	0	0

No corrective action plan was required, and the application appears Y2K Ready.

Exceptional Children Headcount Report Application

The purpose of the Exceptional Children Head Count Report Application is to provide reports to the Federal Exceptional Children program in Washington, DC to serve as the basis for the allotment of Federal Exceptional Children funds to participating agencies. Reports are also provided to the North Carolina Department of Public Instruction's Allotments Section to serve as a basis for the allocation of federal funds when received.

Our procedures included an initial assessment, functional analysis, code analysis, and error analysis of the Exceptional Children Head Count Report Application. Based on the results of these procedures, the Exceptional Children Head Count Report Application appears Y2K Ready.

Below is a summary of the types of errors found during the course of our assessment:

Error Classification	Emergency	High	Medium	Low
Number of Errors	0	0	0	0

No corrective action plan was required, and the application appears Y2K Ready.

Principals Monthly Report Application

The Principals Monthly Report (PMR) Application supports the system that generates reports for enrollment and membership statistics by grade level for schools.

Our procedures included an initial assessment, functional analysis, code analysis, and error analysis of the PMR Application. Based on the results of these procedures, the PMR Application appears Y2K Ready.

Below is a summary of the types of errors found during the course of our assessment:

Error Classification	Emergency	High	Medium	Low
Number of Errors	0	0	0	0

No corrective action plan was required, and the application appears Y2K Ready.

Student Information Management System

The Student Information Management System (SIMS) is a comprehensive set of computer based tools utilized in the administration, planning, management, and reporting of student related programs and information at the local, district and state levels.

Our procedures included an initial assessment, functional analysis, code analysis, and error analysis of the SIMS Application. Based on the results of these procedures, the SIMS Application appears Y2K Ready.

Below is a summary of the types of errors found during the course of our assessment:

Error Classification	Emergency	High	Medium	Low
Number of Errors	0	0	0	0

No corrective action plan was required, and the application appears Y2K Ready.

Department of Revenue

Summary of Results for the Department of Revenue

Below is a table that summarizes the results of the Y2K IV&V assessment for the remaining mission critical application at the Department of Revenue.

Y2K Readiness Assessment Opinions at the Time of Review						Total Applications Reviewed for Department
Verification & Validation Assessments			Due Diligence Assessments			
Y2K Ready	Y2K Ready with Minor Modifications	Not Y2K Ready	DD Fully Demonstrated	DD Moderately Demonstrated	DD Not Demonstrated	
1	0	0	0	0	0	1

Results by Application for the Department of Revenue

Below is a summary of the Y2K readiness assessment results for the remaining mission critical computer application at the Department of Revenue.

OSA initially planned to do the Independent Verification and Validation (IV&V) of the mission critical applications at the Department of Revenue. However, prior to the initiation of our effort, the Department of Revenue contracted with an independent vendor to do the IV&V of its applications. The vendor was an approved Y2K IV&V vendor, so OSA chose to exclude our IV&V of these applications since it was apparent that our project would duplicate efforts already underway.

We worked with the Department of Revenue and identified four mission critical applications. The results of the IV&V for three of these mission critical applications were reported in our main Year 2000 Independent Verification and Validation report issued in November 1999. The remaining application is the Integrated Tax Administration System (ITAS), and the results of the IV&V for this application are reported here.

The assessment completed for the Department of Revenue mission critical applications differs from our IV&V assessments in that the vendor identified Y2K errors, communicated them to the Department Revenue, and tested the corrections made by the Department of Revenue to ensure they adequately addressed the errors. This approach enabled the vendor to offer a Y2K Ready opinion on all of the Department of Revenue mission critical applications, including the Integrated Tax Administration System (ITAS).

Department of Transportation

Summary of Results for the Department of Transportation

Below is a table that summarizes the results of the Y2K IV&V assessment for the remaining mission critical application at the Department of Transportation.

Y2K Readiness Assessment Opinions at the Time of Review						Total Applications Reviewed for Department
Verification & Validation Assessments			Due Diligence Assessments			
Y2K Ready	Y2K Ready with Minor Modifications	Not Y2K Ready	DD Fully Demonstrated	DD Moderately Demonstrated	DD Not Demonstrated	
0	1	0	0	0	0	1

Results by Application for the Department of Transportation

Below is a summary of the Y2K readiness assessment results for the remaining mission critical computer application at the Department of Transportation.

Fiscal System

The Fiscal System of the North Carolina Department of Transportation provides financial accounting and management for NCDOT financial transactions. The Fiscal System is divided into the following major functions: Commercial Accounts, Federal Aid New, General Ledger, Job Orders, and Work Orders. The core of the Fiscal System is the General Ledger business function. This business function is responsible for managing General Ledger activity. This application functionality provides the main application reports and the ability to do fiscal accounting during the monthly and year-end batch jobs.

Our procedures included an initial assessment, functional analysis, code analysis, functional testing, and validation of critical functions of the Fiscal System. Based on the results of these procedures, the Fiscal System appears Y2K Ready with Minor Modifications.

Below is a summary of the types of errors found during the course of our assessment:

Error Classification	Emergency	High	Medium	Low
Number of Errors	3	0	13	123

These errors had the following impacts on the functionality of the Fiscal System.

EMERGENCY IMPACT ERRORS

One emergency error was due to an incorrect calculation of Year 2000 dates.

There was another job which abended due to a wrong sort step in the year 2000.

We noted another emergency error due to a wrong load module.

All three of these emergency impact errors were fixed by the Agency during the IV&V, and the testing cycles were re-run successfully. Emergency errors have no effect on the opinion of Y2K Readiness of the application since they have been corrected and re-tested during the IV&V.

MEDIUM IMPACT ERRORS

We noticed thirteen medium impact errors during our assessment, and the errors caused jobs to either abend or produce wrong totals in the reports. The rectification effort requires either a program modification or table modification.

LOW IMPACT ERRORS

We noted one-hundred-and-twenty-three low impact errors that are mainly cosmetic in nature (affect the manner that dates appear on screens or on reports) or have a very minor impact on the application functionality. The Agency may wish to consider correcting these errors to improve the cosmetics and accuracy of the application. However, these errors do not impact the overall Y2K readiness opinion of the application.

The Department of Transportation has submitted a corrective action plan to address the 13 medium impact errors and 123 low impact errors. They report that all 13 medium impact errors and 77 of the low impact errors have been corrected, retested, and migrated into production. They also stated that the remaining forty-six low impact errors will be repaired and placed into production by the end of the year. With the correction of the medium impact errors, the Department of Transportation believes that the application now appears Y2K Ready.

Employment Security Commission

Summary of Results for the Employment Security Commission

Below is a table that summarizes the results of the Y2K IV&V assessment for the remaining mission critical application at the Employment Security Commission.

Y2K Readiness Assessment Opinions at the Time of Review						Total Applications Reviewed for Department
Verification & Validation Assessments			Due Diligence Assessments			
Y2K Ready	Y2K Ready with Minor Modifications	Not Y2K Ready	DD Fully Demonstrated	DD Moderately Demonstrated	DD Not Demonstrated	
0	1	0	0	0	0	1

Results by Application for the Employment Security Commission

Below is a summary of the Y2K readiness assessment results for the remaining mission critical computer application at the Employment Security Commission.

Financial Accounting and Reporting System

The Financial Accounting and Reporting System (FARS) is a proprietary Information Engineered system that is specifically tailored for government use. The system performs general accounting, check writing, accounts payable/purchase order, time distribution, and cost allocation functions, integrating and managing the necessary and sometimes shared information in a cost-effective manner.

Our procedures included an initial assessment of the FARS system, review of the processes that ESC used to remediate and test the system, analysis to identify the system's critical business functions, automated code analysis, and analysis of each Y2K error detected by the automated code analyzer. We did not perform validation testing of the system or a detailed inspection of the ESC's test plans and results. Based on the results of these procedures, the ESC FARS system appears Y2K Ready with minor modifications.

Below is a summary of the types of errors found in analyzing the results of the automated code analysis of the ESC FARS system:

Error Classification	Emergency	High	Medium	Low
Number of Errors	0	0	16	13

MEDIUM IMPACT ERRORS

We noted sixteen medium impact errors. Fifteen of the errors were related to the system's critical business functions. The remaining medium impact error was related to non-critical business functions. Below is a description of impact of the errors affecting critical business functions.

- Two errors in the Cost Allocation module would cause records to fail the selection process for cost allocation.
- One error in the Cost Allocation module could cause invalid transaction data to be written to the WIP file.
- One error in the Cost Allocation module would cause a record to be written with a wrong century.
- Ten errors in the Cost Allocation module would cause the fiscal year in the batch record to be written "00".

- One error in the Check Writing module would cause an invalid discount amount to be written to the warrant file.

LOW IMPACT ERRORS

We noted thirteen low impact errors that are mainly cosmetic in nature (affect the manner that dates appear on screen or on reports). The Agency may wish to consider correcting these errors to improve the cosmetics and accuracy of the application. However, these errors do not impact the overall Y2K readiness opinion of the application.

The Employment Security Commission has submitted a corrective action plan to address the 16 medium impact errors and 13 low impact errors and states that the corrective changes will be installed by year end to ensure that the application appears Y2K Ready.

General Assembly

Summary of Results for the General Assembly

Below is a table that summarizes the results of the Y2K IV&V assessments for the mission critical applications at the General Assembly.

Y2K Readiness Assessment Opinions at the Time of Review						Total Applications Reviewed for Department
Verification & Validation Assessments			Due Diligence Assessments			
Y2K Ready	Y2K Ready with Minor Modifications	Not Y2K Ready	DD Fully Demonstrated	DD Moderately Demonstrated	DD Not Demonstrated	
0	0	0	2	0	0	2

Results by Application for the General Assembly

Below is a summary of the Y2K readiness assessment results for the mission critical computer applications at the General Assembly.

The General Assembly in the Legislative branch elected to perform IV&V of their two mission critical applications through an independent vendor. These mission critical applications are the Legislative Payroll system (which processes under a third party package called Geac SmartStream: HR) and the Bill Drafting and Tracking system (which processes under a third party software package called LEGIScribe). To avoid disruption during the 1999 legislative session the General Assembly delayed the IV&V assessment until the conclusion of the session.

The General Assembly completed a Due Diligence assessment for the mission critical applications which involved review of the application vendor Y2K Readiness statements, an assessment of the application remediation approach, and an assessment of the testing

activities used to ensure the application is Year 2000 ready. The approach also included a review of application computer hardware and operating systems to ensure the vendor had proposed a reasonable approach to ensure Y2K readiness. The vendor made recommendations with which the General Assembly complied, and the net result of the assessment was an opinion from the vendor that reasonable and prudent measures had been taken to ensure that both of the mission critical applications were Y2K Ready. This opinion equates to the Office of the State Auditor's "Due Diligence Fully Demonstrated" opinion.

North Carolina State University

The Office of the State Auditor had intended to perform an IV&V assessment on the Contracts and Grants Application at North Carolina State University and include the results in this supplemental report. However, the application is not yet installed in the production environment and has not been available for us to perform our assessment. University information systems personnel recently informed OSA that the installation date of the application has been delayed until January 2000. They stated that the application has been written and tested with sample data in a Y2K compliant environment but can not yet be installed in the production environment due to dependencies on the PeopleSoft Payroll Application that is not yet ready to interface with the new Contracts and Grants application. University personnel noted that they have developed a business continuity/contingency plan to ensure continued operations in the year 2000 should the application fail or should it not be installed by the end of the year. University personnel have submitted this plan to the Y2K Project Office. We have encouraged the University to thoroughly test the plan to ensure its quality since the plan may be needed to continue operations in the Year 2000.

APPENDIX A

LIST OF Y2K IV&V VENDORS WITH CONTACT INFORMATION

Vendor and Address	Contact Information
Affiliated Computer Services (ACS) 150 Fayetteville Street Mall, #2740 Raleigh, NC 27601	Betsy Justus, Vice President - Business Development Phone: (919) 755-3311 Fax: (919) 828-5009
Complete Business Solutions, Inc. (CBSI) 32605 W. 12 Mile Farmington Hills, Michigan 48334	Arvind Malhotra, Director - Public Sector Phone: (919) 676-2433 Fax: (919) 821-1137
HMS Company 210 East Broad Street, Suite 207 Falls Church, Virginia 22046	Charles Hall, President Phone: (703) 532-3095 Fax: (703) 532-3081
IMI Systems, Inc. 2222 Chapel Hill-Nelson Highway, Suite 120 Durham, NC 27713	Richard Newns, Vice President Phone: (919) 572-2750 Fax: (919) 572-2656
Keane, Inc. 2525 Meridian Parkway, Suite 400 Durham, NC 27713	Tamara Anderson, Branch Manager Phone: (919) 544-0891 Fax: (919) 544-0895
OAO Corporation 2222 East Highway 54, Suite 210 Durham, NC 27713	Bill Wade, Vice President - Information Systems Services Division Phone: (919) 544-2737 Fax: (919) 544-1957
RAH Software Technology 3211-A Bramer Drive Raleigh, NC 27604	Robert Henry, President Phone: (919) 954-0030 Fax: (919) 954-7122
Sapiens Americas 2525 Meridian Parkway, Suite 300 Durham, NC 27713	Monica Wooden, Senior Vice President Phone: (919) 405-1700 Fax: (919) 405-1702

APPENDIX

SUMMARY LIST OF A RESULTS REMAINING A DEPARTMENT

Applications that have undergone source code scans or functional testing			
Department/Application	Y2K Readiness Opinion at the Time of Review		
	Y2K Ready	Y2K Ready with Minor Modifications	Not Y2K Ready
Department of Environmental and Natural Resources			
Drinking Water Compliance Monitoring System			X ²
North Carolina Agriculture Cost Share System		X ³	
Department of Health and Human Services			
Eligibility Information System (Work First and Medicaid)		X ²	
Health Services Information System		X ²	
Department of Public Instruction			
Cash Management Application	X		
Exceptional Children Headcount System	X		
Principals Monthly Report Application	X		
Student Information Management System	X		

² The Agency has implemented a corrective action plan to correct the application errors and reports that the application now appears Y2K Ready.

³ The Agency has submitted a corrective action plan and has committed to fully implement the plan before the end of the year to ensure that the application appears Y2K Ready.

Applications that have undergone source code scans or functional testing			
Department/Application	Y2K Readiness Opinion at the Time of Review		
	Y2K Ready	Y2K Ready with Minor Modifications	Not Y2K Ready
Department of Revenue			
Integrated Tax Administration System	X		
Department of Transportation			
Fiscal System		X ²	
Employment Security Commission			
Financial Accounting and Reporting System		X ³	
Totals	5	5	1

The following are applications for which a due diligence assessment was conducted.

Applications that have undergone due diligence assessments			
Department/Application	Y2K Readiness Opinion at the time of the Review		
	Due Diligence Fully Demonstrated	Due Diligence Moderately Demonstrated	Due Diligence Not Demonstrated
General Assembly			
Bill Generation and Tracking System	X		
Legislative Payroll	X		
Totals	2	0	0